Origins

50/51

Darwin's Demise

Essays to mark the bicentennial year of his birth

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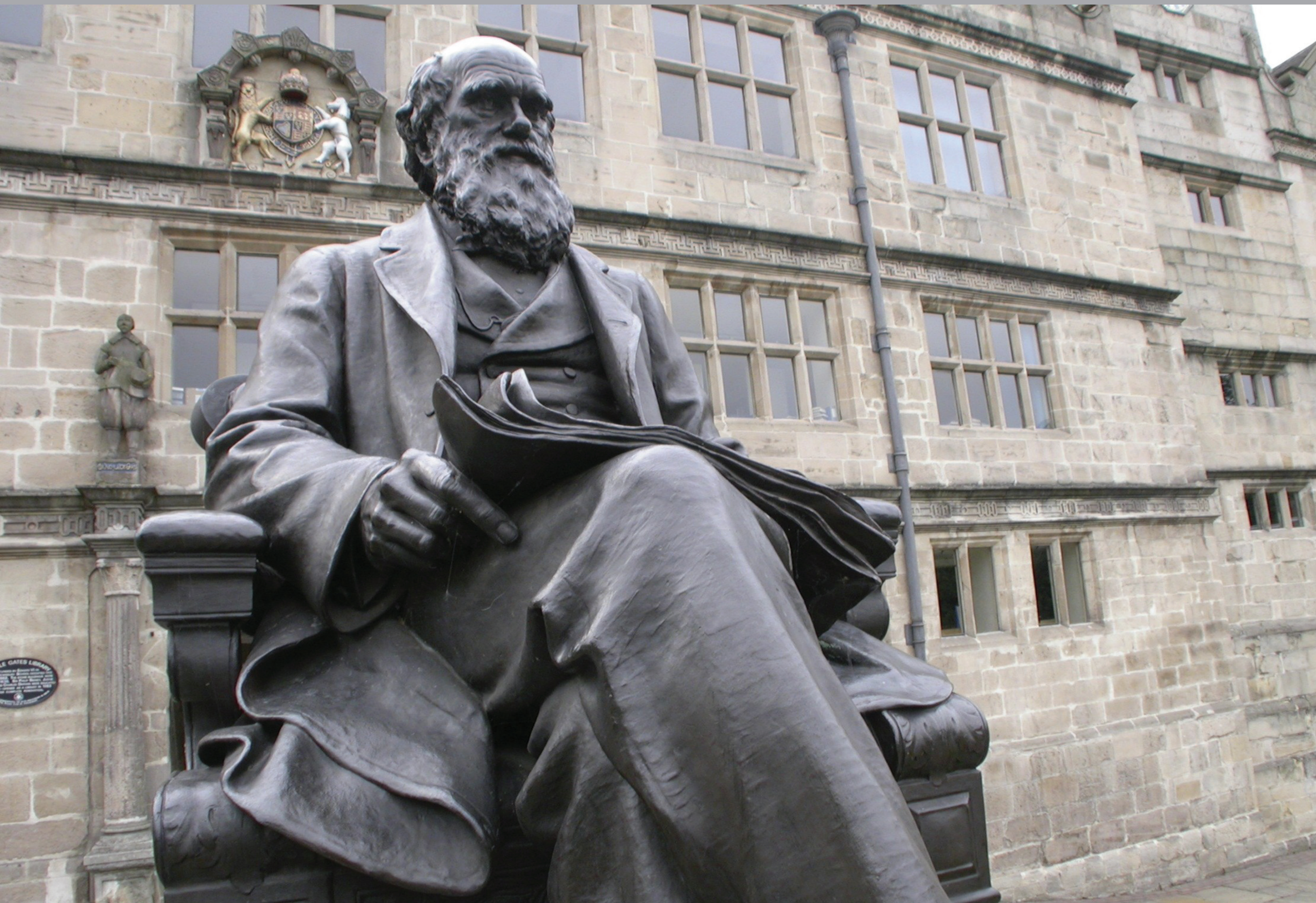
The Journal of **The Biblical Creation Society**



In this bicentennial year of the birth of Charles Darwin, the British Natural History Museum has chosen to install this statue of Charles Darwin in the prime elevated position at the end of the main hall of the museum. The founder, Richard Owen has been relegated to a side area and not even dusted down!

Statue of Charles Darwin in the British Museum of Natural History.
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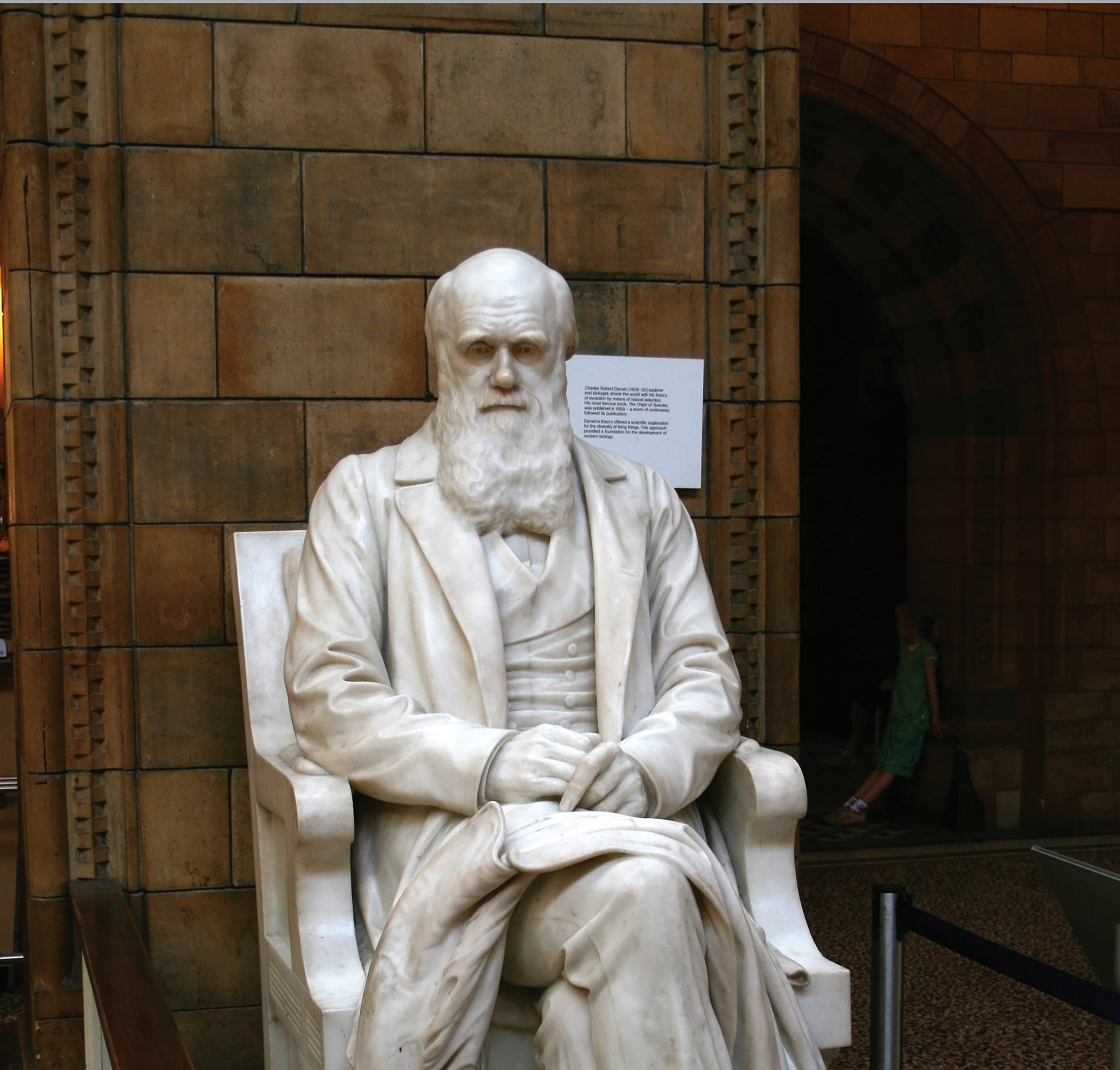
Charles Robert Darwin (1809 - 82) explorer and biologist, shook the world with his theory of evolution by means of natural selection. His most famous book, The Origin of Species, was published in 1859 – a storm of controversy followed its publication.
Darwin's theory offered a scientific explanation for the diversity of living things. This approach provided a foundation for the development of modern biology.

Editorial: On Darwin anniversaries

In this bicentennial year of Darwin's birth and the 150th anniversary of the publication of "On the Origin of Species", it is appropriate to reflect on the way occasions for celebration have been marked.

First we look at a lecture delivered by Thomas Huxley to the Royal Institution on March 19, 1880. This was to mark 21 years since the publication of Darwin's *magnum opus* and it establishes a standard for rhetoric and polemic for all subsequent celebrations. From our vantage point of history, we have to interpret Huxley's words as a combination of wishful thinking and spin. He passes over those aspects of evolutionary theory that were problematic (Darwinism had no theory of inheritance, natural selection as a creative force was still controversial, the fossil record provides evidence of animal radiations from an ancestral population – but this does not confirm Darwinian gradualism nor does it explain the origin of those ancestral populations). Huxley's willingness to elevate evolution to "historical fact" should be interpreted as a deduction from his own atheistic worldview, which makes evolution a necessity.

The title of the lecture was "The coming of age of the Origin of Species". Huxley drew attention to the way Darwin's approach was much more than a scientific theory about origins: it was a conceptual framework for science in general, with impacts everywhere:

> "In fact, those who have watched the progress of science within the last ten years will bear me out to the full when I assert that there is no field of biological inquiry in which the influences of the "Origin of Species" is not traceable; […] and the general doctrine of Evolution, to one side of which it gives expression, finds in the phenomena of biology a firm base of operations whence it may conduct its conquest of the whole realm of nature."

Huxley pointed out that Darwinism affects the way science is done: it comes with a philosophical approach that changes the research orientation of scholars. This is a theme that has resurfaced regularly through the past 150 years. The most widely cited is Theodosius Dobzhansky's title of an article published in the *American Biology Teacher (1973)* : "Nothing in biology makes sense except in the light of evolution". It is as though acceptance of evolution has become the hallmark of any serious thinker and certainly of anyone responsible for the education of the next generation of scientists.

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Huxley develops his presentation by seeming to put the Theory of Evolution to the test. He claims it stands up to criticism very well: "But the progress of knowledge has justified Mr. Darwin to an extent which could hardly have been anticipated." He refers to dramatic fossil discoveries, notably of *Archaeopteryx* in 1862, that have filled in the gaps between major groups of organisms:

> "Thus it will be observed that the whole tendency of biological investigation since 1859 has been in the direction of removing the difficulties which the apparent breaks in the series created at that time and the recognition of gradation is the first step towards the acceptance of evolution."

"Astonishing progress" has been made in embryology, according to Huxley. "And the results of these embryological investigations are in complete harmony with the requirements of the doctrine of evolution." These advances in knowledge made all previous objections to biological evolution "appear childish". Those who have studied embryological development are considered to have all the evidence they need:

> "Any one who has watched the gradual formation of a complicated animal from the protoplasmic mass which constitutes the essential element of a frog's or a hen's egg has had under his eyes sufficient evidence that a similar evolution of the animal world from the like foundation is, at any rate, possible."

Embryology was actually in its infancy, and it can be argued that Huxley's view of the egg as a "protoplasmic mass" actually impeded the progress of science. More recent knowledge of development has revealed the profound discontinuities that exist between basic types of organisms.

The above evidences were considered by Huxley to remove dissent, but not to compel assent. For that, he said, we must turn to palaeontology. Darwin is acknowledged to have struggled with this, pointing to the impoverishment of the fossil record and predicting that future discoveries would yield evidence favouring his theory. Two decades later, Huxley considered the situation transformed. Fossils from the Tertiary had increased knowledge fifty-fold: "Simply this, that if the doctrine of Evolution has not existed palaeontologists must have invented it."

With a sense of triumph, Huxley contrasted the claims of "wild speculation", which greeted the *"Origin of Species"* in 1859, with the "sober statement of conclusions" warranted 21 years later:

> "I venture to repeat what I have said before, that, so far as the animal world is concerned, Evolution is no longer a speculation, but a statement of historical fact. It takes its place alongside those accepted truths which must be taken into account by philosophers of all schools."

In the following years, acceptance of evolution did not mean acceptance of Darwinism. Some actually describe this period as the eclipse of Darwinism. Mendelian genetics explained all Darwin's examples of variation resulting from artificial selection as due to innate, rather than novel, factors (see Marc Surtees' article in this issue). The 100th anniversary of Darwin's birth was not the event some hoped it to be, because many scholars were lukewarm about his significance.

Then came the birth of Neo-Darwinism and the "Modern Synthesis". Darwinian gradualism and Mendelian genetics were harmonised and many scholars considered the big questions about evolutionary transformation to be answered. The centennial of the publication of *"The Origin of Species"* was marked by numerous events. George Gaylord Simpson (1960), professor of vertebrate palaeontology at Harvard University, said that the "centennial has been most elaborately celebrated by conferences, symposia, all manner of meetings and oratory, and a veritable spate of publications." Simpson's main concern in his contribution to these proceedings was to explain the conceptual revolution brought by Darwin:

> "At this point there is reason for a summing up not so much about Darwin himself as about the continuing impact on the revolution of which he was the chief instigator."

In his address, Simpson contrasted the "sway of superstition" that preceded Darwin with the "rational universe" he ushered in. In this, he echoed Huxley's claim that Darwin changed the way we think about science and knowledge.

> "Evolution is, then, a completely general principle of life. […] Evolution is a fully natural process, inherent in the physical properties of the universe, by which life arose in the first place and by which all living things, past or present, have since developed, divergently and progressively. This world into which Darwin led us is certainly very different from the world of higher superstition."

Mendelian genetics explained all Darwin's examples of variation resulting from artificial selection as due to innate, rather than novel factors.

Other contributors to the Centennial celebrations claimed that evolutionary theory was well-grounded on data, that science was continually confirming the essential features of Darwinism, and that the theory should be regarded as a historical fact. The next 50 years was marked by a continuing stream of similar affirmations.

The current anniversary has exceeded all those that have gone before, and the public has been left in no doubt about the robustness of evolutionary thinking. As an example of an academic contribution, I have selected an article by Professor Peter Bowler, author of many relevant books on the history of Darwinism, including one with the title *"The Eclipse of Darwinism"* (1992). His bicentennial essay (2009) has the title "Darwin's originality". Like the earlier testimonials, Darwin is held in high esteem for ushering in a worldview characterised by undirected natural processes in opposition to plan and purpose in the natural world.

> "But the non-Darwinian vision of evolution unfolding to an orderly, predictable plan has been essentially marginalized by acceptance of the key insights on which Darwin based his theory of natural selection."

Bowler goes further than many of his predecessors in making explicit the tension between Darwin's worldview and the Christian conception of a benevolent Creator. If God is responsible for creation, then the means He chooses to turn design concept into reality reflects on His character.

> "One of the most disturbing aspects of Darwin's theory was its appeal to the struggle for existence as the natural process that equates with the breeder's activity as a selecting agent. This very harsh vision of nature certainly threatened the traditional belief in a benevolent Creator. [. . .] It has to be admitted that, by making death itself a creative force in nature, Darwin introduced a new and profoundly disturbing insight into the world."

This point has not escaped the attention of people who use Darwinism as an argument against believing in God. Such people argue that if God were to have used the evolutionary process, he would be malevolent and not worthy of worship. This makes it easy for them to choose the other option of saying that there is no God. The Theistic Evolution stance, that God brought His creation into existence via the process of evolution, is regarded as incoherent. In this, they follow the same path as Charles Darwin. His theological views changed with time, pushed relentlessly by his inability to reconcile Theism with his evolutionary thinking. On May 22, 1860, Darwin wrote to the American botanist Asa Gray to explain why he tended towards Deism:

> "With respect to the theological view of the question. This is always painful to me. I am bewildered. I had no intention to write atheistically. But I own that I cannot see as plainly as others do, and as I should wish to do, evidence of design and beneficence on all sides of us. There seems to me too much misery in the world. I cannot persuade myself that a beneficent and omnipotent God would have designedly created the Ichneumonidae [wasps] with the express intention of their [larva] feeding within the living bodies of Caterpillars, or that a cat should play with mice. Not believing this, I see no necessity in the belief that the eye was expressly designed. On the other, I cannot anyhow be contented to view this wonderful universe, and especially the nature of man, and to conclude that everything is the result of brute force. I am inclined to look at everything as resulting from designed laws, with the details, whether good or bad, left to the working out of what we may call chance. Not that this notion at all satisfies me. I feel most deeply that the whole subject is too profound for the human intellect. A dog might as well speculate on the mind of Newton. Let each man hope and believe what he can. […] But the more I think the more bewildered I become; as indeed I probably have shown by this letter."

Asa Gray was an enthusiastic supporter of Darwin, but he always sought to reinterpret the theory in terms of God's purposeful activity in the world. For him, evolution had a goal and a direction. This should have alerted Gray to the fact that he was playing with fire, but it did not. Endorsement of Darwinism ultimately means assenting to Darwin's worldview. Every anniversary of Darwin has emphasised the essential element of the undirected, purposeless operation of natural law and chance as the underpinning philosophy. Yet many continue to imagine that they can treat Darwinism as objective, value-free science. As an example, this year, some have set themselves the task of "Reclaiming Darwin" from the atheists. Such a stance fails to acknowledge that the methodology adopted by Darwin could never discern the presence of a Creator because it has an inbuilt epistemological veto. This topic is developed in this issue by several authors, notably Ray Trainer, Sylvia Baker on Thomas Henry Huxley, and myself on Darwin's mentors.

This special issue of *Origins* is not just to critique Darwinism – we have a vision of moving forward. We want to see science built on a more robust foundation than atheism can provide. This means developing a science that is consistent with Christian theism. It means changing the way these issues are debated in the public arena. This is the vision shared in Sylvia Baker's personal plea for dialog. This is a burden for all of us to bring to God in prayer. ■

David Tyler

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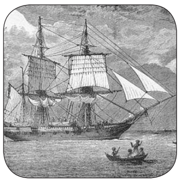
Contents

Bicentenary Year of
The Birth of Charles Darwin
November 2009

HISTORICAL BACKGROUND



8 **Darwin – then and now**
Sylvia Baker

What would Darwin think of the evidence available today?

Sylvia Baker explores the rise of modern Biology. Belief in the Bible inspired the work of early biologists and now recent developments show that genetics cannot be reconciled with neo-Darwinism.

12 **Darwin's mentors**
David Tyler

Two Christian Professors and the geologist Charles Lyell were key figures in developing the scientific skills of the young Charles Darwin. He was much more selective, however, about influences on his worldview thinking.

20 **Thomas Henry Huxley: lessons from Darwin's frontman**
Sylvia Baker

Huxley was at the core of a campaign to win popular approval for the new 'faith' of evolution. He was not so much interested in following the evidence as in looking for a way to avoid belief in creation.

26 **Pasteur – one of the greatest scientists in history…**
Sylvia Baker

Darwin is often described as the greatest scientist of all time. The author of this article disagrees, discussing the enormous and ongoing benefits to the world of the scientific work of Pasteur.

SCIENTIFIC BACKGROUND

30 **The Galapagos Finches**
Nancy Darrall

Virtually every biology textbook champions the Galapagos finches as a central proof of evolution. However, the reality is that biological variation provides flexibility to aid survival in hostile conditions and is part and parcel of the originally created (plant or animal) kind.

40 **The conflict between Mendel and Darwin**
Marc Surtees

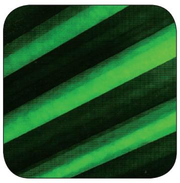
Mendel's work on the laws of inheritance was a direct challenge to Darwin's theory. This article explains why this is so and how the theory of evolution has since been accommodated to try and resolve the issues.

DARWINISM AND THEOLOGY

47 **Darwin and the theology of evolution**
J H John Peet
We must be clear on our theology of Scripture before we can evaluate any scientific approach to life.

50 **Darwin's struggle with the problem of evil**
Ray Trainer
Darwin had a specific, yet inaccurate, view of how God relates to His creation. This did not match up to the reality of the natural world in general and to evil within the natural world in particular. This article examines the tensions and consequences resulting from error.

BOOKS



53 **The Darwin Conspiracy –**
Origins of a Scientific Crime by Roy Davies
Essay review by David Tyler
The claim that Darwin was a plagiarist deserves serious evaluation by all who are interested in the history of evolutionary thought.

REPORT

58 **The Darwin Exhibition: distorted history and inexcusable false rhetoric comes to London**
James Powell
The Darwin exhibition at the British Museum of Natural History in London, November 2008-April 2009.

EPILOGUE

63 **Disputes or dialog in the contemporary debate**
A personal plea: *please* permit the debate!
Sylvia Baker
Involved in creationist writing for over 30 years, the author makes a personal plea for an open debate about evolution in the public arena, the classroom and the church as well as debate within the creationist community where different opinions are held.

Darwin – then and now

Sylvia Baker

The increased focus on Darwin and his influence in this bicentennial year provides a welcome opportunity to place the controversial creation/evolution debate in its historical context. Those who are familiar with the history of science will be aware that modern science owes its original existence and its successful continuation to belief in an ordered, planned, rational universe. It required humans who believed they were created in God's image and thereby capable of understanding how that universe might be designed to act as pioneers. In short, the history of science belongs to creationism. This is not just the ranting of an ignorant and bigoted minority but is rather a view of history that can easily be confirmed by any scholar willing to take the time and make the effort. One such scholar is secular humanist Steve Fuller, Professor of Sociology at the University of Warwick. Two of his recent books (Fuller, 2007 and 2008) investigate the theme in detail and he eventually concludes that:

> The 'track record' of Neo-Darwinism is parasitic on prior creationist breakthroughs over which Neo-Darwinists now claim sole ownership, and which creationists have yet to claim back as their own.
> (Fuller, 2008, p 233).

This article will claim back one strand in the development of modern biology. It will demonstrate that modern genetics owes everything to creationism and virtually nothing to Darwinism, which, on the contrary, hindered its development.

> “It is possible to chart the rise of modern biology from the 17th century to the 20th via the work of three convinced creationists.

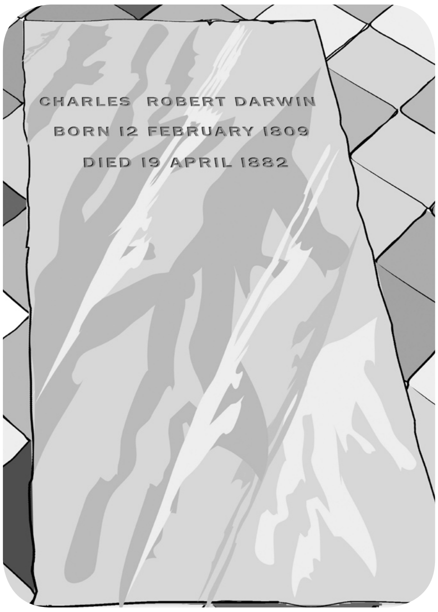
A creationist trajectory

It is possible to chart the rise of modern biology from the 17th century to the 20th via the work of three convinced creationists. Steve Fuller refers to the research tradition that connected them. Referring to the history of biology, he says:

> What is now called “Mendelian genetics” was contributed by people who held the counter-Darwinian assumption that every member of a species, regardless of its generational history, is programmed with a reproductive propensity. That assumption is a legacy of special creationism, a research tradition in natural history that connects the devout Christians Linnaeus, Cuvier and Mendel (Fuller, 2007, pp 139-140).

The first of our three was John Ray (1628-1705) not mentioned by Fuller, but very much in the same creationist research tradition. Ray is often referred to as 'the father of natural history'. The second, who relied heavily on the work of John Ray, was Carolus Linnaeus (1707-1778), often referred to as 'the father of modern taxonomy (plant and animal classification). The third, Gregor Mendel (1822-1884), who could well be described as the 'father of modern genetics' and is certainly regarded as its founder, took inspiration from the work of Linnaeus. All three 'fathers', whose lives spanned three centuries, were not simply devout Christians; they were also 'special creationists'. They accepted a face-value reading of the book of Genesis and in each case their belief in the creation of original 'kinds' inspired and informed their work. It is interesting to note that while able scientists holding all kinds of religious beliefs, together with those holding none, have helped to advance modern science, it is so often creationists who act as 'fathers' and provide the breakthrough discoveries on which others are then able to build.

John Ray, in the 17th century, believed that in studying God's creation it would be possible to understand more of the wisdom, power and goodness of God. This motivation led him to describe and classify thousands of species of plants, birds, insects, mammals, fish and reptiles. He based his system of classification on his observations of anatomy and physiology, taking the influence of the environment into account, and thus paved the way for the work of Linnaeus the following century. One of his most influential books, published in 1691, was entitled *The*



Drawing of Darwin's gravestone in Westminster Abbey. © Jack Lewis.

Wisdom of God Manifested in the Works of the Creation and was based on sermons that Ray, an ordained Anglican, had preached.

Carolus Linnaeus, in the 18th century, built on the work of Ray, and others, in formulating the binomial system of classification that we still use today. For example, it was he who classified humans as *Homo sapiens*. Linnaeus was the son of a Swedish Lutheran pastor and retained an unquestioning belief in the Bible's account of creation throughout his life. He was inspired, in the same way as Ray, to study nature as a way of learning more about the Creator. He was also influenced by the account in Genesis of God's command to Adam to name the animals in the Garden of Eden. Steve Fuller comments on Linnaeus and his influence:

> By his death in 1778, Linnaeus was widely regarded as the most significant scientist since Newton. Although the two differed in both topic and method, there was no denying that their careers exemplified a synergy between cutting-edge science and enlightened Christianity. Science continued to be indebted to creationism in the 19th century...Thus while Darwin denied that biological species were either specially created, immutable or intelligently designed, he nevertheless retained Linnaeus' binomial classification of species (Fuller, 2008, p.66).

Linnaeus believed that species were specially created (that is, created in specific groups) and intelligently designed. Originally he believed that species could not change but he revised this view when he realised that viable hybrid forms of plants could sometimes be produced. However, Linnaeus was no evolutionist; Darwin's ideas would have horrified him. He came to believe that there was some limited flexibility within the original created kinds but that this had always been part of God's plan in that the potential for limited change had been there from the beginning. This remains the standard position held by many creationists in the present day.

Gregor Mendel (19th century) was a contemporary of Charles Darwin and the contrast between the two could hardly be exaggerated. Whereas Darwin lived a very comfortable life because of family wealth, and enjoyed the blessings of life with a large family, Mendel was a monk, living and working in a monastery. Darwin became famous and was eulogised during his lifetime because of his scientific writings; Mendel's were rejected and ignored. Darwin, the unbeliever, was buried with pomp and ceremony in Westminster Abbey while the devout Mendel lived in obscurity and was essentially ignored until twenty years after his death and forty years after he published his seminal work. Many authorities agree that Mendel's work was rejected because it conflicted with Darwinism and a later article in this journal is devoted to that conflict. The point here is that Mendel opposed Darwin because he was a creationist. Once again, the framework provided in Genesis, put to use by a dedicated and convinced Christian, resulted in a major step forward for biological science, one that was delayed for forty years by the influence of Darwinism. Mendel was searching for the rules of combination that would constitute the original language or code provided by God and intended to produce a rich variety amongst living things. Like Newton in an entirely different context, he believed that the problem could be investigated mathematically. His statistical approach provided the key to further investigation of genetics and with it he demonstrated that the process of inheritance involved both variety and stability, something he had been led to expect by his creationist presuppositions.

This trajectory, over the course of three hundred years, transformed the confused picture presented by a bewildering variety of living things. The natural world was systematically described and studied and eventually opened up at the genetic level. This process by-passed Darwin and his theory completely, except for the hindering influence that Darwinism eventually had on it. Steve Fuller, who fully acknowledges the creationist roots of genetics, says:

> Darwin fundamentally resisted the idea that nature possesses a machine-like structure that might imply, as it did for Newton, a divine mechanic. This came out of his inability, if not refusal, to fathom the mathematical formulae that purported to provide evidence for statistical laws of heredity, sent to him by Gregor Mendel shortly after publication of *Origin of Species* (Fuller, 2007, p.43).

So Darwin (and others) knew of Mendel's experiments, rejected them on ideological grounds and held up the progress of genetics for forty years. Meanwhile, Darwin's own theory was not faring too well. Fuller again:

> Contrary to popular accounts, Darwin failed to offer a properly mechanistic account of evolution because he lacked a credible theory of hereditary transmission. Indeed, by the time *Origin of Species* reached its 50th birthday in 1909, Darwin's theory was itself close to extinction in biology – though it continued to enjoy admirers in theology and sociology. Darwinists could only offer "just so" adaptation stories to explain species change (Fuller, 2007, p.60).

And Fuller also explains what happened next:

> Contrary to how the matter is sometimes portrayed in folk histories of science, evolution became the common theoretical paradigm of the life sciences only once natural history and experimental genetics were unified in carefully crafted text-books and popular histories as the "neo-Darwinian synthesis". This feat, a product of the 1930s and 1940s, was largely the work of Theodosius Dobzhansky and Julian Huxley. If it appears that the life sciences have been brought closer together in the aftermath of their efforts, that is due at least as much to the concentration of financial backing and political interest as to genuine intellectual breakthroughs in molecular biology (Fuller, 2007, p.4).

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So Darwin (and others) knew of Mendel's experiments, rejected them on ideological grounds and held up the progress of genetics for forty years.

In other words, far from Darwinism sweeping all before it in the development of biology, it took another thirty or forty years after the rediscovery of Mendelism before the two concepts could be combined and Darwinism rescued. And what of that combination, the "neo-Darwinian synthesis"? Where does it stand today? The answer to that question is fascinating.

The creationist paradigm is vindicated

In July 2008, the Linnaean Society of London held a special conference, *The Driving Forces of Evolution: from Darwin to the modern age,* to celebrate the 150th anniversary of the presentation of Darwin's theory to that society, an event which occurred sixteen months before the publication of *Origin of Species*. They brought together experts from such fields as symbiogenesis, hybridogenesis, horizontal gene transfer and epigenetics. Symbiogenesis, hybridogenesis and horizontal gene transfer are all mechanisms by which genetic material can be combined or transferred between organisms. In principle, these processes are fully consistent with a creationist view of genetics, since they involve existing genes. Epigenetics is different. This term refers to the processes which cause changes in gene expression by mechanisms other than changes in the underlying DNA sequence. Creationists have recognised for some time that epigenetics is a potential source of difficulty for Darwinian theory.

The following are direct quotations from abstracts of papers presented at the conference. In reading them, bear in mind the paradigm within which Ray, Linneaus and Mendel all operated. They believed that God had originally designed a wonderfully rich variety of living things which could be classified in distinct groupings. Linnaeus went on to realise that hybridization and therefore possibly other mechanisms could lead to further variety, within definite limits. In other words, the originally created hereditary information contained the potential for more variety but not for the emergence of completely new forms. Mendel was seeking to investigate and quantify that capacity for variation, still within the creationist paradigm of distinct kinds. The quotations are taken from the programme and abstracts for the conference. What they are essentially saying is that the most recent developments in genetics cannot be reconciled with the neo-Darwinian synthesis. They cannot be explained by selection pressures acting on small random changes in the genes.

From *Evolution reconsidered: on the origin of kingdoms* by Jan Sapp:

> The study of microbial phylogeny and evolution, over the past three decades, represents an interdisciplinary synthesis divergent in both methods and concepts from the classic evolutionary synthesis of the 1930s and 1940s.

From *The role of epigenetic variation in adaptive evolution* by Eva Jablonka and Marion J Lamb:

> Most of the problems about the nature and origin of heritable variations were thought to have been solved when genetics became part of the Evolutionary Synthesis in the 1930s and 1940s. In that Synthesis it was assumed that heritable variation depends on random gene mutations with small effects.
>
> The inheritance of developmental variations was deemed to be impossible, and was explicitly excluded from the Synthesis. Development was thought to have no direct effect on heredity, and therefore no direct effect on evolution.
>
> We believe that the rise of epigenetics during the 1990s has necessitated significant changes in the gene-centred view that dominated 20th century evolutionary thinking about variation. Epigenetics influences evolutionary theory in two ways: first, it shifts the focus from single genes to phenotypes and developmental networks; second, it demonstrates that heritable phenotypic variations may be independent of DNA variations, and that the origin of such variations may be developmental.
>
> Although an epigenetic approach to evolutionary problems – an approach that emphasizes phenotypes and plasticity rather than genes and gene shuffling – is not incompatible with the Evolutionary Synthesis, the inheritance of epigenetic variations is a direct challenge to it. We therefore believe that the Synthesis no longer provides an adequate theoretical framework for evolutionary biology, and that epigenetic inheritance has to be an important component of the new, 21st century, evolutionary synthesis.

From *Epigenetics in Plant Evolution* by Hugh Dickinson and Robert Grant-Downton:

> In plants, transgenerational inheritance of epigenetic information is a genuine, if not well-studied, phenomenon. The potential importance of transmission of epigenetic information on the evolution and adaptation of plant populations is probably underrated. Technological advances in high-throughput 'epigenomic' technology are likely to reveal their influence and alter our view of plant evolutionary biology.

The writers of these abstracts are all committed evolutionists and are therefore trying to accommodate new discoveries in genetics within that paradigm. However, the implications for evolutionary theory of what they are describing are serious. Darwin himself thought that the cell was an undifferentiated blob and had no satisfactory explanation of how his theory might operate at a cellular level. Mendel's discoveries, which showed heritable characteristics proceeding down the generations in complex but predictable ways, were no help to him at all. Darwin and his followers did not want the mechanism for inheritance to be complex for that would make it much more difficult to account for by a chance process. They did not want it to be predictable and stable for how then could evolution proceed? The neo-Darwinian synthesis seemed to provide a satisfactory answer to these problems, created for Darwinism by early genetics. Chance, but small, changes in DNA were supposed to provide the raw material for natural selection to act upon. Adaptation was supposed to operate via mutations at the level of the gene. This in itself raises all kinds of questions, but now, at the beginning of the 21st century, there is apparently no need to ask them. The neo-Darwinian synthesis has been pronounced wanting as the complexity of genetic mechanisms becomes more and more apparent and the role of DNA becomes correspondingly more and more secondary, dependent upon complex 'epigenetic' processes.

The more that the process of inheritance is seen to be complex, the more that it depends on the operation of 'codes' (we now have an 'epigenetic' as well as a 'genetic' code to account for), the more that the cell is seen to include multiple 'machines', operating as a whole and only as a whole, the closer the picture becomes to that which inspired Ray, Linnaeus, Mendel and many other of the creationist 'fathers' who so successfully established modern science. Steve Fuller believes, as do many others, that disciplines such as molecular biology and genetics are actually design-based. The investigative scientists in these fields, despite their evolutionary protestations, in practice treat their research material as though it were designed. To let Fuller have the final word:

> Were Darwin transported to today's world, and educated in such largely design-based sciences as genetics and molecular biology that were developed after his death, would he continue to interpret the balance of the evidence as telling against intelligent design in nature? Evolutionists take for granted that the answer would be "yes". However, if you believe (as I do) that the advent of genetics and molecular biology in the first half of the 20th century outweighs the significance of Darwin's own work, you would be forced to conclude that Darwin would reinterpret natural selection as a design–based mechanism, possibly propelled by a divine engineer.
>
> The first decade of the 21st century is an apt time to revisit the negotiated settlement between the geneticists and the natural historians that constitutes the neo-Darwinian synthesis. It may be time to replace a diffuse appeal to natural selection with a humanly accountable sense of intelligent design (Fuller, 2007, p 164). ■

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Darwin's mentors

David Tyler

The young Charles Darwin did not make a success of his education. He wasted his time and lacked motivation to develop any professional skills. Three mentors can be credited with bringing about a remarkable transformation over a period of just a few years. This article is concerned with these people and their differing influences on Darwin's life and subsequent career. Conclusions are drawn regarding these influences and their relevance for today.

Darwin's childhood was lacking in parental warmth and support. His mother was bedridden and unable to provide much mothering. She died when he was only 8 years old. He wrote in his autobiography: "I can remember hardly anything about her except her death-bed, her black velvet gown, and her curiously constructed work-table." Robert Darwin, his father, was a medical doctor who was fully occupied with professional activities. He was big in stature, weighing more than 24 stone, and Charles revered him. He had a reputation for being a closet freethinker who had imbibed the revolutionary libertarianism of his father, Erasmus Darwin. In later years, Emma Darwin (Charles' wife) spoke of Robert Darwin as someone who found boyish noise and untidiness to be unpleasant, and that he did not understand Charles or show him much sympathy. The whole household was not at ease when the Master was at home.

Charles was sent to a boarding school in Shrewsbury, but did not gain much from it. Learning Greek and Latin was a persistent and unwelcome chore for him, for languages did not come easily. After a year, his father realised that a change was needed. Darwin wrote (in his autobiography):

> "When I left the school I was for my age neither high nor low in it; and I believe that I was considered by all my masters and by my father as a very ordinary boy, rather below the common standard in intellect. To my deep mortification my father once said to me, "You care for nothing but shooting, dogs, and rat-catching and you will be a disgrace to yourself and all your family"."

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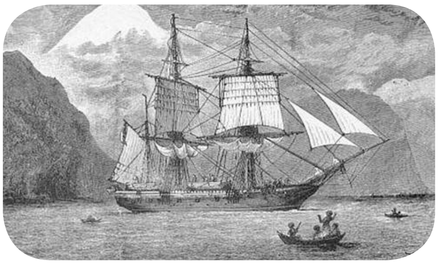
Consequently, in 1825, when Charles was only 16 years of age, he was sent, with his brother, to Edinburgh University (still the seat of Enlightenment thinking) to study medicine. However, Charles lacked any motivation for these studies also and was hopelessly distracted by other pursuits. He had come to believe that his father would set him up for a comfortable life, and this prospect "was sufficient to check any strenuous efforts to learn medicine." It was during this period that Charles' interest in natural history flowered. The catalyst for this was Robert Edmund Grant, an expert on sponges. According to Desmond and Moore (1992, p.34):

> "nothing was sacred for Grant. As a freethinker, he saw no spiritual power behind nature's throne. The origin and evolution of life were due simply to physical and chemical forces, all obeying natural laws."

Grant had cited *Zoonomia,* Erasmus Darwin's book on evolution, in his doctoral thesis, and it is known that Charles had read the book during his second year (at the behest of his father). Its contents would, no doubt, have been a topic of conversation between them.

Charles recalled the next step in his life:

> "After having spent two sessions in Edinburgh, my father perceived, or he heard from my sisters, that I did not



H.M.S. Beagle in Straits of Magellan.

> like the thought of being a physician, so he proposed that I should become a clergyman. He was very properly vehement against my turning into an idle sporting man, which then seemed my probable destination."

Bearing in mind that Robert Darwin came from the tradition of atheism, we can infer that he must have been a desperate man! After some deliberation, Charles consented with the plan and moved to Cambridge University. However, things did not go well there either.

> "During the three years which I spent at Cambridge my time was wasted, as far as the academical studies were concerned, as completely as at Edinburgh and at school."

Nevertheless, it was during this time, that Charles met a remarkable man who befriended him and helped him find his feet in the world.

Mentor No. 1: Revd Professor John Stevens Henslow

J. S. Henslow became an influential figure because of his numerous

This portrait of John Stevens Henslow accompanied his obituary in 'The Illustrated London News' of 22 June 1861.
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academic contributions to the University of Cambridge. In 1819, he co-founded the Cambridge Philosophical Society as a focus for discussion and scientific communication. Among the other co-founders was Adam Sedgwick, who appears later as Mentor no. 2. Henslow became Professor of Mineralogy in 1823 and then took a chair in Botany in 1827. He was an activist in reorganising the way science was taught at Cambridge – encouraging practical laboratory work and field excursions to develop hands-on expertise. He played a major role in establishing the Botanic Gardens as a resource for teaching and research.

Henslow was a Christian and he appears to have been an Evangelical. He declared himself happy with the wording of the 39 Articles of the Church of England, which capture the spirit of the Reformation and historic Biblical Christianity. As an academic, he did not compartmentalise his Christianity so that "beliefs" were separated from the disciplines of mineralogy or botany, but he sought to develop an integrated perspective. In this, he is a fine role model for Christian academics – but this thought cannot be developed further in this article.

Henslow was aware that many people considered species to be stable entities, so that the species today appear much the same as when they came from the hand of the Creator. He was also aware that informed creationists, like Linnaeus in his mature years, had moved away from this position and were prepared to think of speciation (the development of new species) within the boundaries of created kinds. This would put the created kind at the taxonomic level of Genus, Family or even higher. As a scholar in the Baconian tradition, Henslow knew that the only way to gain a greater understanding of these natural variations was to document them, analyse them and develop hypotheses to test. This is exactly what Henslow set out to do. His botanical research was carried out from a creationist perspective by first documenting natural variations. The first edition of his "A Catalogue of British Plants" appeared in 1829, the same year that Darwin arrived at Cambridge. Henslow researched hybridisation, recognising that some hybrids had been given a separate species name rather than being designated a variety:

> A further attempt to determine the natural lines of cleavage in species came in 1830 […]. Henslow showed that, by manipulating moisture, manuring and shade in garden-grown primulas, he could experimentally reproduce morphological variants observed in the field. Again, the stability of created species is the assumption underlying this work. Henslow supported the linnaean analysis of *Primula* veris with its three varieties: gamma acaulis (primrose) in opposition to J. E. Smith's more modern 'splitting' view. (Kohn *et al.* 2005).

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It is hard to overstate the importance of Henslow's work. His theoretical concept (variation within the Created Kind) was distinctively different from other botanists. Henslow employed the word "collation" to describe the way he catalogued plants and compared their variants. Recent work by Kohn *et al* (2005) has shown just how much Henslow was a pioneer in the way he was thinking about speciation:

> "Thus Henslow was not just identifying plants: he was organizing his herbarium to emphasize variation within species. Remarkably, he seems to have been the only British botanist at the time doing this. We have surveyed the herbaria of C. C. Babington, J. H. Balfour, William Borrer, W. A. Bromfield, John Downes, R. K. Greville, W. J. Hooker, Leonard Jenyns, W. A. Leighton, N. J. Winch and William Wilson. Henslow's fellow botanists seldom placed more than one plant on a sheet and none practised 'collation'. In Henslow's hands, however, plants received from these same people were collated in a comparative display that illustrated natural variation. This rigorous attention to variation throughout the 1820s was unique to Henslow."

An interesting link between Henslow's botanical research and his earlier role as Professor of Mineralogy has been suggested. He brought skills to his studies of botany that he had used to advantage in studying minerals.

> "But Henslow recognized that the inherent tension between the stability and variability of species posed a major problem: "Our knowledge…has not been hitherto sufficiently advanced, to furnish us with any precise rule for distinguishing the exact limits between which any given species of plant may vary." What distinguished Henslow's practice from that of his contemporaries was his intention systematically to turn the creationist species concept into a precise instrument of scientific analysis. This difference of approach may have arisen because Henslow had originally been a physical scientist – a professor of mineralogy who applied the rigour of contemporary crystallography to the species problem." (Kohn *et al.* 2005)

Darwin brought his personal interest in natural history from Edinburgh to Cambridge. This soon led to him meeting Henslow and feeling the excitement of what he was doing. There must have been something about Darwin that Henslow liked, because they spent a lot of time together. Indeed, Darwin became such a regular companion of the professor that some of the university dons began calling him *"the man who walks with Henslow."* (Darwin, 1887, p.9). He encouraged Darwin to attend some geology lectures delivered by Adam Sedgwick, and recognised the impact that geology was making on his thinking. After graduation, it was Henslow who persuaded Sedgwick to take Darwin with him on his planned trip to familiarise himself with the geology of North Wales. After this trip, when Darwin arrived back at his home in Shrewsbury, it was a letter from Henslow that brought the invitation to travel on *The Beagle* as companion of the ship's captain.

These opportunities came about because of Henslow's winsome personality and his very large circle of contacts. Darwin could not have found a better mentor and father-figure. *The Beagle* voyage helped to strengthen the relationship:

> "During *The Beagle* voyage, Darwin and Henslow corresponded as often as the primitive postal system would allow. Henslow became the main recipient of Darwin's massive collection of scientific samples, despatched home at irregular intervals during the voyage. He saw to it that these samples were passed on to the appropriate experts for analysis, and took it upon himself to publish extracts of Darwin's letters in respectable scientific journals." (Carter, 2007)

When Darwin returned home in 1836, his name and his work were known in the scholarly world. He was a personality in his own right. People recognised him as a man with potential and he was treated with respect. "Henslow had made him what he was, not only by giving him the chance of a lifetime with the invitation for *The Beagle* voyage, but also by his kindly attentions and support thereafter" (Browne, 2002, 153).

Over the next two decades, Darwin's thinking diverged substantially from Henslow. The two men continued to communicate, but Darwin did not consider Henslow someone he could confide in regarding his thinking about evolutionary transformation. When *"On the Origin of Species"* was published, he sent Henslow a copy, and wrote: "I fear you will not approve of your pupil in this case" (Browne, p.84). Henslow did not approve. In a letter to Leonard Jenyns dated 26 January 1860, he wrote:

> "The book is a marvellous assemblage of facts and observation – and no doubt contains much legitimate inference but it pushes hypothesis (for it is not a real theory) too far." (cited in Armstrong, 2000, 69).

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> I fully believe a better man than Henslow never walked this earth.

Nevertheless, Henslow was always the gentleman, willing to allow others to get a hearing for their views and slow to condemn. He chaired the famous 1860 debate between Wilberforce and Huxley, knowing that debate about the meaning of evidence should be encouraged:

> In 1860, at a meeting at the Cambridge Philosophical Society, both Sedgwick and Henslow were to be found debating the merits of Darwin's new book. Henslow "vigorously defended Darwin's right to investigate the question of living origins, although he, like the others, balked at jettisoning divine creation." […] In this, Henslow showed the mettle that his friends still admired. Elderly he might be, but he retained his inner fire. Yet his affection for Darwin evidently pushed him further than his heart would otherwise have taken him." (Browne, 2002, 117)

He was prepared to bring Darwin's evolutionary ideas into his own botany lectures to students. This is probably the earliest example of someone "teaching the controversy" about evolution. "While telling them of his own unshakeable religious faith, he nevertheless encouraged them to respect intellectual endeavour wherever it might lead." (Browne, 2002, 118). He died the following year.

Henslow was universally acclaimed as a scholar and gentleman. He was reputed to be a person tolerant of any view as long as it was held sincerely. His son-in-law attributed this to his own strong convictions, which were not threatened by others having a different view (Armstrong, 2000, 64). Darwin's view was expressed to J. D. Hooker, 18th May, 1861:

> "I fully believe a better man than Henslow never walked this earth."

As an indication of this esteem, Charles and Emma Darwin named three of their children (Annie, George, and Leonard) after Henslow's children.

Mentor No 2: Revd Professor Adam Sedgwick

Adam Sedgwick was the Woodwardian Professor at Cambridge (1818-1873) and President of the Geological Society (1829-1831). He was a specialist in stratigraphy, and had a detailed knowledge of Palaeozoic fossils. As noted above, Darwin attended his lectures and found them very stimulating. These lectures laid the foundations of his geological knowledge.

After gaining a BA degree, Charles spent the early part of 1831 broadening his interests in natural history and geology. From 3-20 August, Sedgwick took Darwin on a 3 week field excursion: the Welsh Marches, Snowdonia and Anglesey. This had the merit of introducing Sedgwick to Henslow's "hands-on" approach to teaching applied science – something that Sedgwick himself adopted as standard practice later in his career. Darwin recorded the trip as follows:

> "Professor Sedgwick intended to visit N. Wales…and slept at my father's house…Next morning we started for Llangollen, Conway, Bangor and Capel Curig. This tour was of decided use in

> teaching me a little how to make out the geology of a country… We spent many hours in Cwm Idwal…"

There is more to this fieldwork than is apparent in the above quote – a useful detective exercise is by Roberts (2001). During this tour, Darwin gained the foundations of how to do field work, how to recognise rocks in the field, how to interpret the findings, and how to provide documentation. This was an invaluable experience that gave Darwin the head start he needed for working independently. All was put to good use on *The Beagle* expedition. This laid the foundations for the next 10 years when Darwin saw himself primarily as a geologist.

> "Darwin used in his geological researches during *The Beagle* voyage – in South America, the Falklands, in Australia – almost every aspect of what Sedgwick had taught him that summer in Wales: the direct line of transect across country, the inspection of sections or exposures, the marking of stratification on a map, the collection of rock specimens, and the careful use of a compass." (Armstrong, 2000, 121).

Sedgwick was an important mentor of Darwin, imparting conceptual and practical skills in geology. He took a rather different position from that of Henslow, in that he drew a line of demarcation between biblical revelation and his geological researches. The words "integration" and "synthesis" were written, if at all, in very small letters. Apart from the Bible revealing God's creative acts, Sedgwick looked exclusively to the geology of his day to answer the "how?" questions. Darwin found this approach one he could work with. But in other respects, Darwin's thinking went in a different direction. Sedgwick was a catastrophist, a position that was reinforced by his familiarity with rocks and fossils through field work. He invoked catastrophism to explain extinction and he was a progressive creationist in his thinking about new species (Roberts, 2009). He held to the reality of Divine acts of creation in the geological past.

How much of this impacted on Darwin? He did not follow Sedgwick either in his catastrophism, or in his thinking about creative acts of God in Earth history. In later years, Sedgwick, who is reputed to have had a fiery temperament, opposed Darwin's ideas on evolution by natural selection, describing the book as "false and mischievous" and claiming that when he read it, he laughed until his sides ached. (Armstrong, 2000, 122).

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Lyell's *Principles* set out to free geological science from Moses and from the catastrophists, and this was the fountain from which Darwin drank deeply during his Beagle travels.

Mentor No 3: Charles Lyell

Lyell's family had achieved considerable wealth and fame, and the youthful Charles studied for the Bar at Oxford University. But his interest in geology became a passion and he spent the rest of his life developing geological ideas as a gentleman scientist. He visited the volcanic region of the Auvergne in 1828, followed by a trip to Mount Etna. The first volume of his influential "Principles of Geology" appeared in 1830. The subtitle of the book explained his distinctive approach: he attempted to explain the former changes of the Earth's surface by reference to causes now in operation. This approach became known as uniformitarianism. Whatever Lyell might have said positively about his attitude to Christianity, his worldview was thoroughly secular. He adopted Enlightenment values and his methodology involved gaining knowledge exclusively through the senses. He considered any appeal to biblical authority to support any understanding of Earth history as an intrusion into the discipline of geology.

Darwin's geological teachers were interested in stratigraphy rather than in models, although they pointed out that depositional mechanisms involved catastrophism. Darwin is likely to have heard about Charles Lyell before he left Cambridge, but he appears not to have sought out his newly published *"Principles of Geology, Volume 1"*. The book, however, was passed to him by Robert Fitzroy, Captain of *The Beagle,* before the ship set sail. Evidently, Fitzroy had had a communication from Lyell requesting feedback on the geological features to be discovered during the voyage.

"Principles of Geology" proved to be Darwin's constant companion. The book enabled Lyell the teacher to steer from a distance a very willing student; Darwin found the uniformitarian framework to be compelling. A decade later, Darwin described the effect the book had on him:

> "The great merit of the *Principles* was that it altered the whole tone of one's mind, & therefore that, when seeing a thing never seen by Lyell, one yet saw it partially through his eyes."
> (Darwin, 1844).

The effect was dramatic. It was as though Darwin soaked up Lyell's interpretative framework and made it his own.

In assessing the significance of *"Principles",* it is important to recognise that Lyell intentionally set out to weaken the influence of catastrophism in geology and specifically to draw a line of separation between geological history and biblical history. On 11 August 1829, he wrote a letter to Roderick Murchison, friend and fellow-geologist:

> I trust I shall make my sketch of the progress of geology popular. Old Fleming is frightened and thinks the

> age will not stand my anti-Mosaical conclusions and at least that the subject will for a time become unpopular and awkward for the clergy, but I am not afraid. I shall out with the whole but in as conciliatory a manner as possible. (Cited in Mortenson, 2006).

So, Lyell's *Principles* set out to free geological science from Moses and from the catastrophists, and this was the fountain from which Darwin drank deeply during his Beagle travels. He arranged for the other volumes of the Principles to be sent out to him.

Within a month after *The Beagle* returned to Britain, Darwin met up with Charles Lyell. Both were keen to be introduced. Darwin wanted to converse with the author of the book that had influenced him so deeply, and Lyell was already proud of his disciple. Through his writings, Darwin had become something of a celebrity and he was introduced to numerous members of the scientific elite in Britain. Lyell and Darwin became close friends, often corresponding and meeting. Darwin was never comfortable unless he had Lyell's approval. He never departed from uniformitarianism, extending it from geology to biology. It was to Lyell that he turned in 1858, when Wallace set out his thinking on the origin of species by natural selection in a short paper, and it was Lyell who arranged the joint presentation at the Linnaean Society that led to Darwin being credited with precedence for the theory.

Statue of Adam Sedgwick in the Sedgwick Museum of Earth History, Cambridge. © Paul Garner.

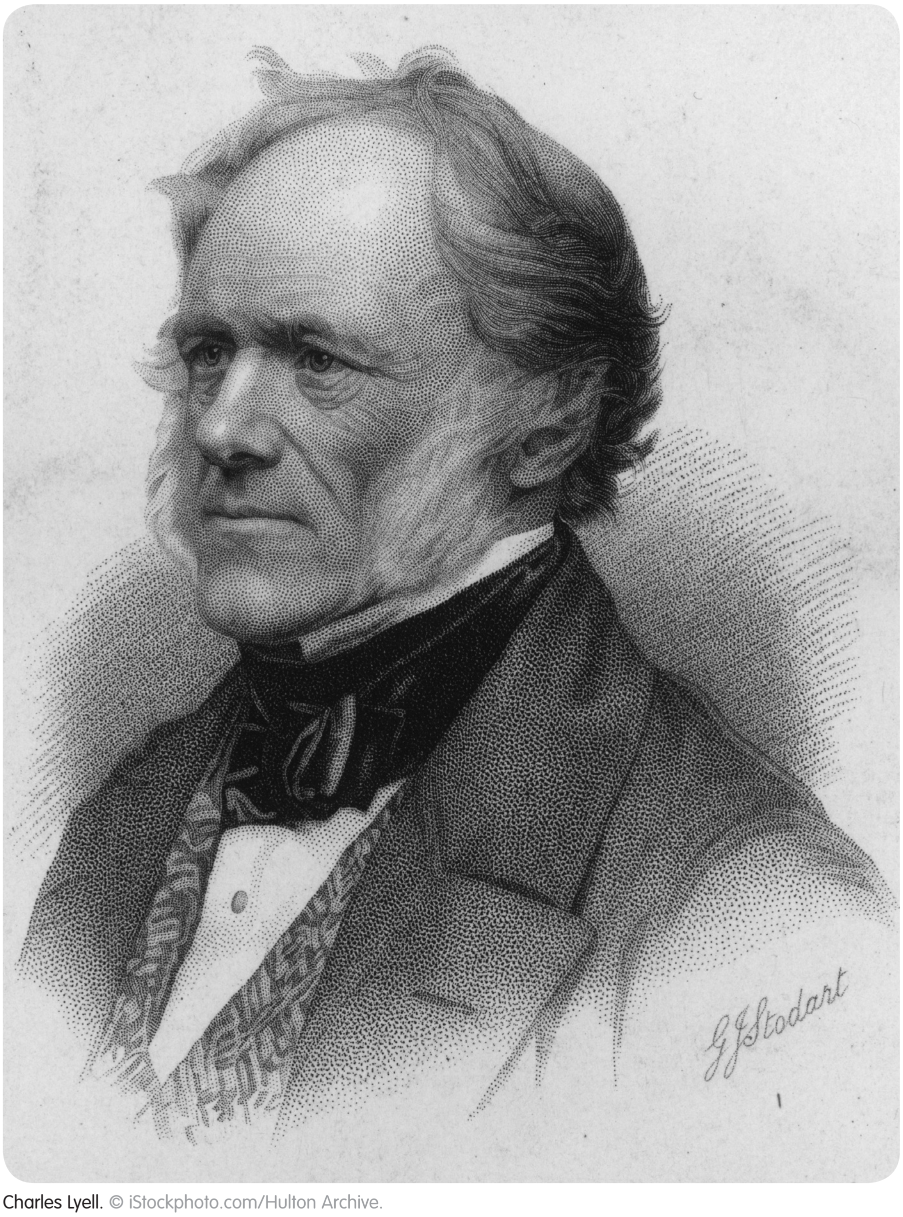
Discussion

The two Christian mentors who provided early influences in Darwin's life gave him skills, opportunities and some clear pointers for developing his intellectual life. Darwin accepted the skills and opportunities, but not the pointers. He chose instead to follow the lead given by Lyell: Enlightenment values, secularised science and uniformitarianism. More specific aspects of this choice are considered below.

1. **Speciation and variability in nature.** Henslow was a pioneer in thinking about variation in nature. His approach was not to speculate, but to observe and document! He had already embarked on a programme of investigation, recognising that living things have the ability to vary/adapt. Darwin should have been very conscious that informed believers in creation did not accept the fixity of species. However, there is no trace of this in his "historical review" of previous work on variation. All variation, for Darwin, was evidence against creation. The incongruity of this situation is so striking that it is hard to give Darwin any benefit of the doubt. It appears it was necessary to ignore Henslow's work in order to present an argument he thought he could win. Significantly, evolutionists have been adopting the same strategy ever since! Despite extensive research into the limits of

variation and the identification of created kinds by creation-oriented biologists (Marsh 1976, Lester & Bohlin 1984, Scherer 1993, Wood and Murray 2003), mere variation is still presented by Darwinists as evidence for their theory.

2. **Patterns in the fossil record.** Sedgwick showed Darwin that organisms appeared abruptly in the fossil record, persisted relatively unchanged and then became extinct. This was the basis of Sedgwick's work on stratigraphy and Darwin knew that Sedgwick interpreted these patterns in terms of Special Creation followed by catastrophe/extinction. Instead of facing up to these facts, Darwin developed a hypothesis about the extreme impoverishment of the fossil record. This proved to be so influential (because researchers were loyal to the theory) that it persisted for nearly 150 years. The trigger for puncturing the bubble was pulled when Gould and Eldredge revisited the issue with their theory of Punctuated Equilibrium (1972). More recently, evolutionary biologists are realising that neoDarwinism as it stands at present cannot account for the relevant data, and the EvoDevo movement is actively seeking ways of moving evolutionary theory closer to the punctuated pattern of change seen in the fossil record.



Charles Lyell. © iStockphoto.com/Hulton Archive.

3. **Extreme reluctance to test uniformitarianism.** With hindsight, it is easy to see that Lyell's uniformitarianism was imposed on the data. Geology has taken many years to start shedding the straightjacket introduced by Lyell, and there is now a much greater openness to consider catastrophist explanations for a great variety of geological phenomena. Lyell did bring some positive contributions to geology, but the doctrinaire way he advanced uniformitarianism has hindered scientific progress. The lesson to be learned from this is that scientists are not immune from ideologies that masquerade as science. The health of science is threatened by dogmas becoming "orthodoxy" and defended by a supposed "consensus" within the scientific community. Everything should be subject to the testing and challenging processes of science. What we are seeing today is a consensus about evolutionary theory rejecting all attempts to critique its main concepts and its handling of data. Evolutionary theory is still being presented as "pure" science, free of ideology and dogma. However, Darwin could never have developed his ideas without the underpinning of uniformitarianism, and *"On the Origin of Species"* is actually a good example of Kuhnian "normal science", where data is force-fitted to the conceptual model.

4. **Metaphysical foundations for science.** Darwin was able to compare the differing methodological approaches of his three mentors. He should have been able to see the importance of metaphysics to science and to recognise that his three mentors came to different conclusions because they were building on different foundations. Yet in Darwin's own work, there is no sensitivity to these issues. He claimed to be Baconian in the way he collected data and built theory by induction – yet the reality was quite different. Darwin's theory is primarily deductive, based on his presuppositions. This

was what Henslow perceived when he commented: "[The book] no doubt contains much legitimate inference but it pushes hypothesis (for it is not a real theory) too far." Many of the scientific critiques of Darwin's book made similar points. There is more to be said on this matter. Lyell had an agenda that was shared only with friends. Writing to George Scrope (geologist and Member of Parliament) on 14 June 1830, Lyell confided that he was adopting a particular strategy for striking a blow against Moses and the confessing Church:

> "I was afraid to point the moral, as much as you can do in the Q[uarterly] R[eview] about Moses. Perhaps I should have been tenderer about the Koran. Don't meddle much with that, if at all. If we don't irritate, which I fear that we may (though mere history), we shall carry all with us. If you don't triumph over them, but compliment the liberality and candour of the present age, the bishops and enlightened saints will join us in despising both the ancient and modern physico-theologians. It is just the time to strike […]" (Cited in Mortenson, 2006).

This is Lyell's Enlightenment agenda surfacing. He was intent on secularising science and equating naturalism with the scientific mindset. But he realised that a head-on battle was not the way to succeed in Victorian Britain, so he advocated a policy of developing Enlightenment thinking in a non-confrontational way and congratulating those "bishops and enlightened saints" who join with the project. History reveals how successful he was! Darwin's enthusiasm for Lyell's uniformitarianism and his naturalism reveals that Darwinism is contingent on non-scientific assumptions. Those who portray Darwinism as a triumph of empiricism are seriously astray. Those who fail to see the secularised worldview as underpinning Darwinism may consider themselves "enlightened saints" but they are actually victims of the delusion whose architect was Charles Lyell.

5. **The Long Shadow of Erasmus Darwin.** The historical material on the youthful Darwin provides the background for appreciating his particular need for mentoring, but it also provides us with an additional discussion point. Ideas have roots. The seeds of Darwin's thinking were first sown by his grandfather. Charles Darwin grew up in a home that promoted a materialistic worldview. His values were moulded by his freethinking father. It was not an accident that he was sent to Edinburgh University, the home of Enlightenment philosophy. Darwin warmed to Grant, and later to Lyell, as these men nurtured his secularised mindset. Whilst he benefited enormously from Henslow and Sedgwick, their willingness to acknowledge the hand of God in the history of life made almost no impression on Darwin. In 1837, he commenced his 'B' notebook on transmutation and gave it the title *Zoomania,* recalling the book Erasmus Darwin had written to promote evolutionary thinking (Desmond & Moore, 1992, 229). Darwin was a child of the Enlightenment project and he consciously trod in the footsteps left by his grandfather. He was no dispassionate observer of the natural world. ■

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Thomas Henry Huxley:
lessons from Darwin's frontman

Sylvia Baker

When *On the Origin of Species* was first published in November 1859, Thomas Henry Huxley immediately came forward as 'chief defender of the faith therein set forth', as one of his biographers has put it (Huxley and Snell, 1909, p.vii). The young man – he was 34 years old, Darwin was 50 – was at the core of a campaign to win popular approval for the new 'faith'. In an important paper, Edward Caudhill (1994) has described how it was Darwin who generated and directed the extensive publicity campaign from the comfort of his house at Downe, where he lived by inherited wealth and investments. Huxley, on the other hand, was forced by circumstances to earn a living and always resented the fact that to succeed in science 'one had to be a man of independent means' (Caudhill, 1994). Darwin encouraged and directed this gifted and talented scientist, an expert in anatomy and palaeontology, into a lifelong commitment to promoting Darwinism.

Huxley is converted

Caudhill's paper describes how Huxley was ready and waiting for a theory such as Darwin's to come along:

> Huxley believed early in his career that science must be independent of theology. He was dissatisfied with creationism but found it difficult to support evolutionary ideas because there was no good explanation for how evolution worked. When natural selection solved that problem for him, he became a lifelong proponent of Darwinism. In public lectures and reviews, Huxley thrived in a glare of publicity that would have withered Darwin. He was Victorian England's foremost public advocate of science. He was also anti-clerical, and he found that Darwin's theory of evolution supported his anti-clerical beliefs (page 443).

Huxley's own account of his 'conversion' to belief in evolution is interesting (Huxley, 2007, pp 204-215). He says:

> I was not brought into serious contact with the 'Species' question until after 1850. At that time, I had long done with the Pentateuchal cosmogony, which had been impressed upon my childish understanding as Divine truth, with all the authority of parents and instructors, and from which it had cost me many a struggle to get free… I confine myself to what must be regarded as a modest and reasonable request for some particle of evidence that the existing species of animals and plants did originate in that way, as a condition of my belief in a statement which appears to me highly improbable. And, by way of being perfectly fair, I had exactly the same answer to give to the evolutionists of 1851-8 (p.204).

Huxley goes on to explain that with very few exceptions, biologists in the 1850s did not have a good word to say about evolution. The only thorough-going evolutionist he knew and respected was Herbert Spencer, who he first met in 1852 and with whom he had many debates:

> Many and prolonged were the battles we fought on this topic… I took my stand upon two grounds: firstly, that up to that time, the evidence in favour of transmutation was wholly insufficient and secondly, that no suggestion respecting the causes of the transmutation assumed, which had been made, was in any way adequate to explain the phenomena (p.205).

During this period, Huxley had debates with Darwin himself:

> I remember in the course of my first interview with Mr. Darwin, expressing my belief in the sharpness of the lines of demarcation between natural groups and in the absence of transitional forms (p.212).

Huxley speculates that most of his contemporaries at this time were in a similar state of mind, in that they were rejecting both the Biblical account of creation and the ideas of evolutionists. He openly admits that he, along with others, was looking for a way to avoid belief in creation:

> That which we were looking for, and could not find, was a hypothesis respecting the origin of known organic forms which assumed the operation of no causes but such as could be proved to be actually at work… The 'Origin' provided us with the working hypothesis we sought. Moreover, it did the immense service of freeing us forever from the dilemma – refuse to accept the creation hypothesis, and what have you to propose that can be

Thomas H. Huxley.

Thomas Henry Huxley. © iStockphoto.com/Hulton Archive.

> accepted by any cautious reasoner (p.213)?

Although Huxley claimed to be only interested in evidence, it is quite plain that he would not have been the least bit interested in any evidence for creation and that religious motives lay behind his acceptance of Darwinism and his life-long campaign to promote it.

An aggressive campaign

The very fact that Darwin needed an anti-religious 'front man', someone to promote his contentious theory to the general public while he remained safely behind the scenes, also says a lot about the status of Darwinism. Pasteur needed to do no such thing when, at about the same time, he made his ground-breaking discoveries and established the germ theory of disease. With Pasteur, it was the evidence that convinced; with Darwin, it was public rhetoric and persuasion that won over the public while many scientists remained unconvinced by the evidence. In fact, it even seems that Huxley himself eventually rejected the idea of natural selection. This is the view held by Hiram Caton and articulated in his article *Getting our History Right: six errors about Darwin and his influence* where he says:

> Many leading naturalists and biologists made significant criticisms of Darwin's work. This includes Gregor Mendel, who believed that his discoveries refuted Darwin's premises about the heritability of traits, and Thomas Huxley, who rejected natural selection (page 59).

Caton goes on to maintain that Huxley rejected natural selection because it denied saltation events, which today would be called macromutations, and because it was inconsistent with the fossil record, something that Darwin himself admits in the *Origin*.

We therefore get the picture of a gifted communicator, determined for religious reasons to use his skills to promote Darwinism, while disagreeing with its most fundamental tenets. After all, the idea of evolution had been around for millennia before Darwin, as Huxley himself readily admitted (Huxley, 2007, 44-46). Darwin's main contribution was a supposed mechanism for it – natural selection – and this was the very thing that Huxley had been waiting for and that had apparently convinced him to take up the Darwinist cause in the first place. It seems that later doubts about the role of natural selection in evolution no longer had the power to trouble him; he was on a crusade to establish Darwinism and to discredit the church and the lack of a credible mechanism was not going to stop him. Today a similar situation prevails. Many present-day biologists doubt that natural selection plays much of a role in evolution and yet they vehemently maintain that evolution itself, in the sense of molecules to man, has happened.

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> With Pasteur, it was the evidence that convinced; with Darwin, it was public rhetoric and persuasion that won over the public while many scientists remained unconvinced by the evidence.

Thomas Huxley, encouraged by Darwin, was very successful in his campaign to influence public opinion. He loved the fight and by the end of the 1860s he had won, in that many (though by no means all) had accepted Darwinism. The battle had served him well and in 1870 he became president of the British Association for the Advancement of Science. His career has parallels with that of Richard Dawkins who has also achieved fame and success, not because of scientific achievements, but because of the aggressive popularising of an atheistic approach to the science of origins.

Some interesting views

Thomas Huxley, surprisingly, held a number of views in common with modern-day creationists and intelligent design theorists. If he was alive today he could be called to give evidence on the creationism/intelligent design side of the debate in several areas, three of which will now be examined.

The teaching of evolution in schools

First, Huxley was opposed to the teaching of evolution to school children. In this he was much more radical than modern-day creationists and intelligent design theorists who are simply advocating that both sides of the debate should be presented in schools. Huxley's views can be found in the preface to Ernst Haeckel's *Freedom in Science and Teaching,* published in 1879. He writes there of how Professor Virchow has raised the question of whether 'the doctrine of evolution should be generally taught in schools or not'. He agrees with Virchow that 'things that are not proven should not be instilled into the minds of young people' so long as Virchow 'will agree to make this excellent rule absolute and applicable to all subjects that are taught in schools', especially, of course, special creation. Huxley then goes on to argue:

> Far be it from me to suggest that it is desirable that the inculcation of the doctrine of evolution should be made a prominent feature of general education… I doubt whether it is the business of a teacher to plunge the young mind into difficult problems concerning the origin of the existing condition of things. I am disposed to think that the brief period of school-life would be better spent in obtaining an acquaintance with nature, as it is; in fact in laying a firm foundation for the

> further knowledge which is needed for the critical examination of the dogmas, whether scientific or anti-scientific, which are presented to the adult mind. At present, education proceeds in the reverse way; the teacher makes the most confident assertions on precisely those subjects of which he knows least; while the habit of weighing evidence is discouraged, and the means of forming a sound judgement are carefully withheld from the pupil (Huxley, 1879).

It is interesting to reflect on what Huxley would have made of the situation today, whereby the exact reverse situation now prevails; children are force-fed evolution in schools and the weighing of evidence in this particular matter is often not just discouraged but actually forbidden.

Professor Steve Fuller has commented on this reluctance of Huxley's to see evolution taught in schools (Fuller, 2008, p 94). He speculates that the reason might be that Huxley secretly agreed with those of his critics who maintained that there is no point in studying pure science if there is no divine plan to uncover and no human mind made in the image of God to discover it with, as the following section will elaborate.

Fuller himself takes a different view from Huxley on the question of what should be taught in schools while agreeing with him that without the concepts of God and design it would probably not be possible to conduct science at all. In the context of schooling and the desired content of textbooks, he urges intelligent design theorists and creationists to reclaim the history of biology, where:

> they have been responsible for concepts in taxonomy, morphology, physiology, genetics and biochemistry that are still very much taken for granted *especially* at the level of the school biology textbook. In this respect, the 'track record' of Neo-Darwinism is parasitic on creationist breakthroughs over which Neo-Darwinists now claim sole ownership, and which creationists have yet to claim back as their own. Moreover, the recovery of this history – ideally in textbook presentations of scientific reasoning – would demonstrate the power of creationist thought in what philosophers of science call the 'context of discovery', the source of scientific inspiration that should be the centre of gravity in science education. After all, theologically informed creationist premises have motivated the conduct of science, the results of which have been used and built upon by both theists and non-theists. Especially in a time when pure science departments are closing for lack of enrolments, this is a potentially powerful selling point (Fuller, 2008, pp233-4). (Italics original)

The history of science and the influence of Darwinism on future scientific endeavour

The second area where creationists would do well to pay attention to Huxley concerns this issue of the history of science. Huxley freely acknowledged that modern science owes its very existence to the Biblical view of the created order and of the people who inhabit it. Steve Fuller in his important book *Science vs Religion: Intelligent Design and the Problem of Evolution* (2007, p.23) describes how Huxley dealt with this issue in an 1893 lecture entitled *Evolution and Ethics*. Huxley could see that Darwinism's naturalistic world–view had been anticipated by Greek philosophers, Hindus and Buddhists but in none of these situations did science as we know it today emerge and he blames the naturalistic world-view itself for that. A view of humans as temporary arrangements of matter, not essentially different from any other such temporary arrangements, discourages further investigation. On the other hand, if humans are made in the "image and likeness of God" the picture is quite different and it is this view which prompted early scientists such as Newton to learn more of the mind of God by studying his creation. Huxley understood that the diminished view of humanity that is part and parcel of Darwinism could easily discourage the pursuit of science in the future as it had in the past. Fuller, himself a secular humanist, concludes (p.23) that no discussion of the relationship between science and religion in contemporary society can be truly honest if it does not keep Huxley's concerns firmly in mind. Fuller sees this theme as so important that he returns to it later in his book:

> Thomas Henry Huxley argued that, as a matter of historical fact, the triumph of modern science is indebted to the monotheistic religions, which elevate humans to "the image and likeness of God" capable of grasping in a detailed and comprehensive manner the unity of nature for the purposes of transforming it according to human needs and purposes. In contrast, the more naturalistic world-views that emerged from the Greco-Roman pagans and the great Eastern religions tended to promote a fatalism that discouraged the industry required for science. Huxley concluded by presenting his largely bewildered late-Victorian audience with a paradox: from a naturalistic standpoint, naturalism itself promotes science only after monotheism has inoculated enquirers against naturalisms's own self-deflating tendencies. I believe that here Huxley was exactly right (pp98-99).

In a nut-shell, Huxley recognised that belief in a designed Universe, together with belief in a human mind capable of discerning and understanding that design, was what had motivated and driven the development of modern science. He could see that once you removed the Designer and the special nature of the human mind there was really no point in carrying science on and certainly no strong incentive to do so.

Theistic evolution

Third, Huxley had some comments and advice to offer to those who, in his day, liked to maintain that the theory of evolution was compatible with modern interpretations of the Bible. In a lecture entitled 'The three hypotheses respecting the history of nature', he explained at length why he likes to refer to the

Thomas Henry Huxley (1825 - 95) biologist, philosopher and educationist, was one of the most influential scientists of the 19th century. His work on comparative anatomy brought him acclaim as a scientist, and his vigorous defence of the theory of evolution earned him notoriety as "Darwin's bulldog".
Huxley was a great popularizer of science and people flocked to hear him speak. He wrote science text-books and his ideas on education were followed in schools and colleges throughout Britain.

Statue of Thomas Henry Huxley in the British Museum of Natural History. © R. Cambridge.

creationist position, of creation in six days a relatively short time ago, as 'Milton's hypothesis' rather than the 'doctrine of creation' or the 'Biblical doctrine'. He said:

> It is quite true that persons as diverse in their general views as Milton the Protestant and the celebrated Jesuit Father Suarez, each put upon the first chapter of Genesis the interpretation embodied in Milton's poem [Paradise Lost]. It is quite true that this interpretation is that which has been instilled into every one of us in our childhood; but I do not for one moment venture to say that it can properly be called the Biblical doctrine… If we are to listen to many expositors of no mean authority, *we must believe that what seems so clearly defined in Genesis – as if very great pains had been taken that there should be no possibility of mistake – is not the meaning of the text at all.* The account is divided into periods that we may make just as long or as short as convenience requires. We are also to understand that it is consistent with the original text to believe that the most complex animals and plants may have evolved by natural processes, lasting for millions of years, out of structureless rudiments. A person who is not a Hebrew scholar can only stand aside and admire the marvellous flexibility of a language which admits of such diverse interpretations (Huxley, 2007, pp117-8). (Italics mine)

To this, modern-day creationists might well respond that they couldn't have put it better themselves.

Writing in about 1885, Huxley reflected on the success of the 'philosophy of Evolution', considering its rise to dominance to be the most portentous event of the nineteenth century (Huxley, 2007, p.198). He goes on to say:

> Even the theologians have almost ceased to pit the plain meaning of Scripture against the no less plain meaning of Nature. Their more candid, or more cautious, representatives have given up dealing with Evolution as if it were a damnable heresy, and have taken refuge in one of two courses. Either they deny that Genesis was meant to teach scientific truth, and thus save the veracity of the record at the expense of its authority; or they expend their energies in devising the cruel ingenuities of the reconciler, and torture texts in the vain hope of making them confess the creed of Science (pp198-199).

That Huxley was not only anti-church but also anti-creation, anti-design in the natural world and anti the plain reading of the Bible, that his battle was primarily with the authority of the Bible, is crystal clear from his writings:

> The doctrine of Evolution does not even come into contact with Theism, considered as a philosophical doctrine. That with which it does collide, and with which it is absolutely inconsistent, is the conception of creation, which theological speculators have based upon the history narrated in the opening of the book of Genesis…In respect of the great problems of Philosophy, the post-Darwinian generation is, in one sense, exactly where the prae-Darwinian generations were. They remain insoluble. But the present generation has the advantage of being better provided with the means of freeing itself from the tyranny of certain sham solutions (Huxley, 207, 218-9).

Modern-day theistic evolutionists would do well to ponder the fact that Thomas Henry Huxley, the man mainly responsible for the success of the theory of evolution, had as his driving motive the freeing of his and subsequent generations from the tyranny of the 'sham' of Biblical authority. They would also do well to consider seriously secular humanist Steve Fuller's well-argued claim that 'a literal reading of the Bible has done more to help than hurt science over the centuries' (Fuller, 2008, p.211).

Conclusion

The Oxford English Dictionary provides two definitions of the word 'frontman':

1. The leader, or lead singer, of a band.
2. A person who represents an illegal organization to give it an appearance of legitimacy.

Thomas Huxley fits the first definition. He was the lead singer of the band, conducted by Darwin behind the scenes, which performed to the ordinary Victorian people of Great Britain and persuaded them to accept a new view of reality.

The second definition at first sight seems too harsh to be applicable in any way to the Huxley/Darwin situation but the fact remains that 150 years after the publication of *On the Origin of Species* the criticisms of Darwin's theory that were made in the nineteenth century remain as valid as ever, while the evidence for intelligent design grows stronger and stronger. Despite Huxley's protestations to the contrary, he was not primarily interested in where the evidence led because he would not permit it to lead him to belief in design and in a Creator. That door for him was closed. Huxley was able to use his undoubted gifts to dazzle the Victorian public. The verdict of history may yet be that he also deceived them. ■

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Pasteur – one of the greatest scientists in history…

Sylvia Baker

During this Darwin bicentennial year, 2009, it has been common to hear Charles Darwin referred to as one of the greatest scientists in history, perhaps even *the* greatest. Such a view is, of course, very much a matter of opinion and there would no doubt be many other contenders for such an accolade. Some would argue that the description properly belongs to Darwin's French contemporary, Louis Pasteur. Both men worked and published in the mid nineteenth century and after the passage of 150 or so years it is possible to compare the outcomes of their labours. This article will briefly describe the discoveries made by Pasteur and will then compare the religious positions taken by the two men, some aspects of their work and their legacies to science and to the world.

> "It could be argued that Louis Pasteur was one of the greatest benefactors of humanity ever to have lived.

Many major discoveries

Most scientists would be very happy if they made one significant breakthrough in their working life. Pasteur made several. He began his career as a chemist and while still in his twenties discovered that crystals rotate polarised light to the right and left. However, he soon moved into the realms of what today would be called microbiology. In fact, Pasteur is known as the Father of Microbiology, so great was his contribution to this field. He was always concerned about the practical application of his discoveries and these were many. They followed from his fundamental work in disproving the idea of spontaneous generation and in establishing the germ theory of disease. Gillen and Sherwin (2008, p.44) list his discoveries, describing how early in his career, in the 1840s, he showed that the souring of milk and butter is caused by the presence of bacteria which convert sugars into lactic acid. Later he invented the process of pasteurisation to preserve wine and other foods. He helped Joseph Lister to develop aseptic surgery and his research into silkworm disease rescued and revived the silk industry in southern France. Pasteur discovered how to immunise chickens against cholera using attenuated bacteria and was successful in vaccinating cows and sheep against anthrax. Following on from this, he made possible the prophylactic treatment of diphtheria, tuberculosis, cholera, yellow fever and plague and in 1885 successfully tested his first vaccine against rabies. It could be argued that Louis Pasteur was one of the greatest benefactors of humanity ever to have lived.

Louis Pasteur. © Wikimedia.org

Pasteur and Darwin: their religious positions

Louis Pasteur was a sincere Catholic believer whose faith directly influenced his life and work. Gillen and Sherwin tell us:

> [Pasteur] had a high view of human life and dignity, loved the compassionate virtues and ideals of the gospel, and held a high view of Jesus as the Son of God. In his address [his inaugural speech at the founding of the Pasteur Institute] Pasteur said, "These are the living springs of great thoughts and great actions. Everything grows clear in the reflections from the Infinite." Pasteur was truly a man of Christian character and action. [He] embraced the values of the Gospel throughout his life. Pasteur believed in prayer, the Bible

Monument to Louis Pasteur outside the Institut Pasteur in Paris, founded in his honour. © Wikimedia.org

> and the truths of the gospel as his goal. He encouraged others to do the same. (Gillen and Sherwin, 2008, pp 51-52).

It appears that Pasteur's faith strengthened as he grew older and particularly as he approached death. His son-in-law, René Vallery-Radot, wrote an extensive biography of Pasteur which included this account of his spiritual condition in his last days:

> Absolute faith in God and in Eternity, and a conviction that the power for good given to us in this world will be continued beyond it, were feelings which pervaded his whole life; the virtues of the gospel had ever been present to him. Full of respect for the form of religion which had been that of his forefathers, he came simply to it and naturally for spiritual help in these last weeks of his life. (Quoted in Gillen and Sherwin, p.50).

The Christian worldview by which Pasteur conducted his life had a direct influence on his discoveries. First, his concern to help those who were suffering affected the direction of his research and followed directly from his Christian principles. Second, both Gillen and Sherwin (2008) and Farley (1978) have described how Pasteur's Christian position affected his science, particularly in regard to the question of origins. It seems that the publication of the French edition of *On the Origin of Species* in 1862 inspired Pasteur to achieve his refutation of the idea of spontaneous generation. He saw that Darwin's theory of evolution required spontaneous generation in its early stages, and he was opposed to Darwinism. John Farley has described a famous address that Pasteur gave at the Sorbonne in 1864, in which he refuted the idea that living matter could arise spontaneously from non-living:

> In his address, Pasteur made very explicit the theological, philosophical and scientific implications of such a doctrine. It was a doctrine that denied the Creation, denied the fixity of species, and supported materialistic concepts. (Farley, 1978, p.145).

Pasteur believed that living things always descended from other living things, a view that was in harmony with his belief in an original creation rather than an evolutionary process. This conceptual framework led him to disprove the idea of spontaneous generation and to establish the germ theory of disease. Occasionally in his writings he used the term 'evolution' to refer to change within a species, or to the variability of bacterial strains, but never in the Darwinian sense of change in the direction of greater complexity (Gillen and Sherwin, 2008, p.49).

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In contrast to Pasteur, Charles Darwin's spiritual journey took him in the opposite direction.

In contrast to Pasteur, Charles Darwin's spiritual journey took him in the opposite direction. By the time of his marriage, just before his thirtieth birthday, he had already lost whatever Christian faith he might once have had. While he was always reluctant to refer to himself as an atheist, in practice he was one, especially where his views concerning origins were concerned. 'My theory', as he liked to call it, was essentially about removing the Creator from the study of biology. It was an attempt to explain the obvious appearance of design in nature by entirely naturalistic, materialistic means.

Pasteur and Darwin: the acceptance of their theories

There is a very striking contrast between the reception of Darwin's views and those of Pasteur. Each of these two scientists made claims which at first seemed controversial, even outrageous. However, whereas Darwin needed an orchestrated campaign, conducted by Thomas Huxley and others, to persuade the population at large to accept his theory, Pasteur's discoveries were very quickly vindicated by repeatable experiments and practical experience.

Louis Pasteur.

The essential difference is that Darwinism was established by public rhetoric while Pasteur's many scientific advances were established by evidence, evidence which has stood the test of time. Nobody today would quibble about anything that Pasteur established, while Darwinism, other than in its very limited sense of change in existing populations, is as controversial a theory as it ever was. Jonathan Wells has summarised the difficulties with the supposed evidence for Darwinian evolution in his classic book *Icons of Evolution* (Wells, 2002). In the preface he writes:

> Darwinism encourages distortions of the truth. How many of these distortions are unconscious and how many are deliberate remains to be seen. But the result is clear: students and the public are being systematically misinformed about the evidence for evolution. (Wells, 2002, p.xii).

Can you imagine anyone writing anything like that about Pasteur's discoveries? In 1986 Michael Denton introduced his influential book *Evolution: a theory in crisis* with these words, and they hold true in 2009:

> The question of evolution is generating more controversy and argument today than at any other time since the "Great Debate" in the nineteenth century. (Denton, 1986, p.15).

How much controversy and argument was being generated about Pasteur's discoveries in 1986, or indeed at any time in the past 150 years? His legacy is not controversy and argument but rather many of the improvements in health care and medicine from which we all currently benefit.

Pasteur and Darwin: their contributions to the progress of science

That Pasteur's work gave an enormous boost to several branches of science is not disputed. It is regarded as a cornerstone of modern medicine and he is known as the Father of both Microbiology and Immunology. Virology could be added to the list through his work on a vaccine for rabies. In contrast, what has Darwin's work added to the progress of science? Claims that evolution is an essential basis for biology, that nothing makes sense without it, are simply false. The list of renowned biologists who have operated from a creationist rather than an evolutionist perspective is very long and impressive. Pasteur himself is one of them. Carl Linnaeus and Gregor Mendel are two more. All of these made foundational discoveries.

Philip Skell has commented extensively on the question of whether or not evolutionary theories have contributed to experimental biology. He says:

> The modern form of Darwin's theory has been raised to its present high status because it's said to be the cornerstone of modern experimental biology. But is that correct? I recently asked more than 70 eminent researchers if they would have done their work differently if they had thought Darwin's theory was wrong. Their responses were all the same: No. I also examined the outstanding biodiscoveries of the past century. Here, as elsewhere, I found that Darwin's theory had provided no discernible guidance, but was brought in, after the breakthroughs, as an interesting narrative gloss. (Skell, 2005).

In fact, most biological research is carried out from a design perspective. Most of biology is to do with understanding the structure and function of living things. Medical research is aimed at understanding how that structure and function has gone wrong and what can be done to bring about restoration. Evolution as a concept does not figure anywhere in either situation. I have personally worked in two different biological research laboratories and the theory of evolution played no part in anything that was being investigated in them. The evidence is that far from benefitting the progress of science, Darwinian evolution has hindered it, particularly in the case of the development of genetics.

Pasteur and Darwin: their wider legacy

The benefits that Louis Pasteur's work has brought to humanity are probably incalculable. His establishment of the germ theory of disease led to immediate changes in medical practice through his collaboration with Joseph Lister, another Christian and creationist. Modern surgery could not progress while so many patients continued to die from post-operative infections and the death of women following childbirth in the nineteenth century from infection had also reached scandalous proportions. Pasteur and Lister worked together to change the situation and their legacy in this respect lives on in every modern hospital. The lives that have been saved through Pasteur's vaccination techniques can also not be counted and the benefits that he has brought to society through the pasteurisation process are immense. The Institut Pasteur in Paris, founded in Pasteur's honour, continues to target infectious diseases, microbiology, immunology and virology. His discoveries did not only benefit medicine and public health but also agriculture and industry.

What of the wider legacy left by Charles Darwin? There can be no doubt that his theory has given an enormous boost to atheism. Richard Dawkins and John Maynard Smith are two modern biologists with a very similar testimony. Both have told of how they came across Darwin's theory in their teenage years and of how it 'liberated' them from religion. How far has the elimination of design and purpose from our understanding of our origins contributed to a sense of despair in current British society? How far has the removal of the presence of the Creator God and his moral law contributed to its ills? These are difficult questions to answer but many would agree that a world in which a Creator God reigns is very different from one in which meaninglessness and chance processes rule.

Of one unfortunate legacy there can also be no doubt. As Richard Weikart (2004) has shown, there is a direct connection between the spread of Darwinian thought and the evils of eugenics and Nazism. Those of us who wish to celebrate Darwin's influence in 2009 need to pause and think of that. ■

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The Galapagos Finches

Nancy Darrall

Darwin's Finches are often quoted as definitive evidence for the theory of evolution and are almost without exception found in biology 'A' level textbooks in the UK. Most creationists of Darwin's time had no difficulty with such variation, seeing it as part and parcel of the originally created plant or animal kinds (See also *Darwin's Mentors* in this issue). New evidence over the last 30 years has not altered the situation. We need have no problem understanding that the variation between finches falls within the boundaries of a created kind.

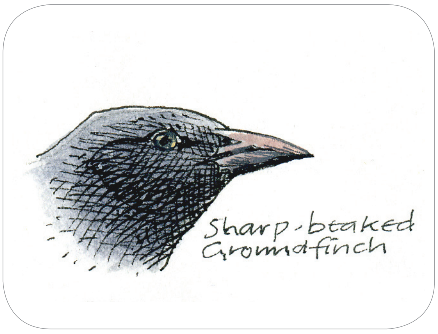
What particularly struck Darwin on his visit to the Galápagos Islands was the extent to which animals can vary. Any changes that aid survival increase the chance of leaving more offspring. This is one of the foundations of Darwin's theory of evolution by natural selection. Darwin went on to claim that descent with modification could explain the whole of the living world; from the early, simple organisms more and more complex forms could evolve by this process. First, we have his observations of variation and we can see in plants and animals today that such variation does occur. Second, when resources are limited, survival favours those best able to compete. We can see that process occurring today in harsh environments where plants die for lack of water and animals for lack of food. In gardens, weeds are highly successful competitors unless we pull them out before they smother our tender garden plants. However, we need to take issue with Darwin's third claim, that we can explain the whole diversity of the living world by the process of descent with modification. To apply the idea on such a large scale is simply unwarranted extrapolation which is not supported by any evidence.

Small Ground Finch. © Philip Snow, Creation Art and Books.

> What struck Darwin on his visit to the Galápagos Islands was the extent to which animals can vary.

There are 14 species of finches on the Galápagos Islands and their variation is used as one of the key proofs of the theory of evolution. But what exactly do they tell us? Were they a cornerstone of his theory and writings? What more do we know today, nearly 200 years later? Do they provide evidence for evolution or do they still support variation within the limits of a created kind?

Darwin's finches are identified by their songs, by differences in size and



Sharp Beaked Ground Finch.
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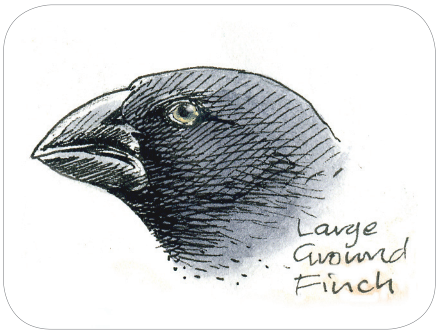

Large Ground Finch.
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shape, especially of their beaks and by their different feeding habits. We might expect that these features would be the same or very similar within a species and distinct from other finch species. This is not the case. Changes in rainfall, competition from other finches and hybridisation between species all cause measurable shifts in body dimensions, particularly of the beak. However, the change in size of the ground finches does not fall outside the range when all four species of ground finch are taken together. Studies of DNA and enzymes show great similarity between the species, indicative of all the finches coming from a common ancestor. On the other hand there are no clear differences that can separately identify the various species. More than that, the changes in beak size are not permanent, but oscillate as the climate varies between wet and dry.

We will look at each point in turn and then consider a Creationist response to Darwin and the dedicated scientists who have recently spent years netting, measuring and observing the feeding and breeding of these finches.

Darwin collected some of the finches living on the Galápagos in 1835 while he was the captain's companion on board the *H.M.S. Beagle*. The variations of the birds on the Galápagos impressed him and he referred to the finches in *The Voyage of the Beagle,* but did not discuss them in his book *Origins*. David Lack, the ornithologist, popularised them as "Darwin's Finches" in his book published in 1947. The variations between the finches, he said, were adaptations as a result of natural selection and provided evidence for evolution. In the 1970s, Peter and Rosemary Grant arrived in the Galápagos and embarked on what turned out to be a 31 year study of the finches observing their distribution, diet, hybridisation, population explosions and collapse. Earlier work provided descriptive snapshots, but this study gives us details of changes over the years and importantly, changes during cycles of drought and abundant rainfall.

Medium Ground Finch. © Philip Snow, Creation Art and Books.

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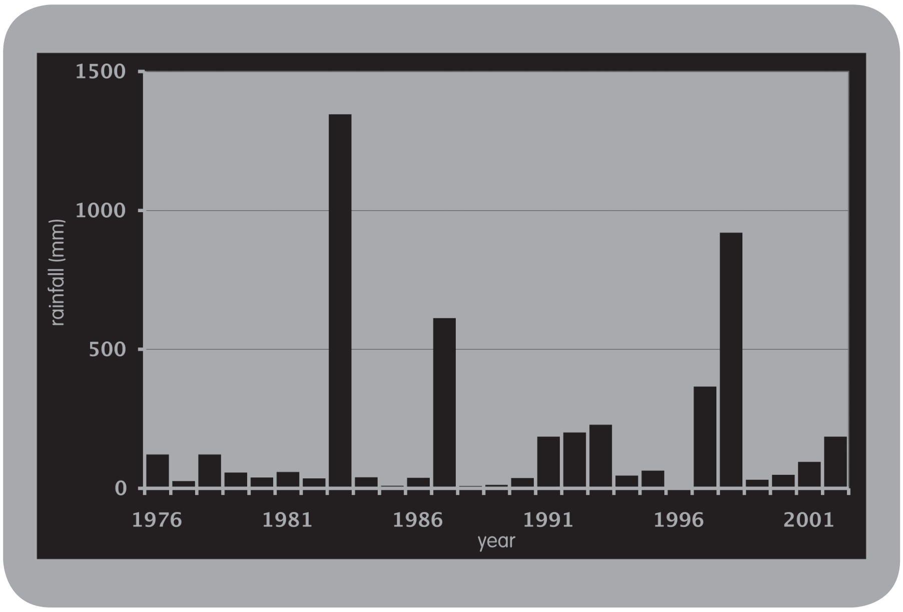
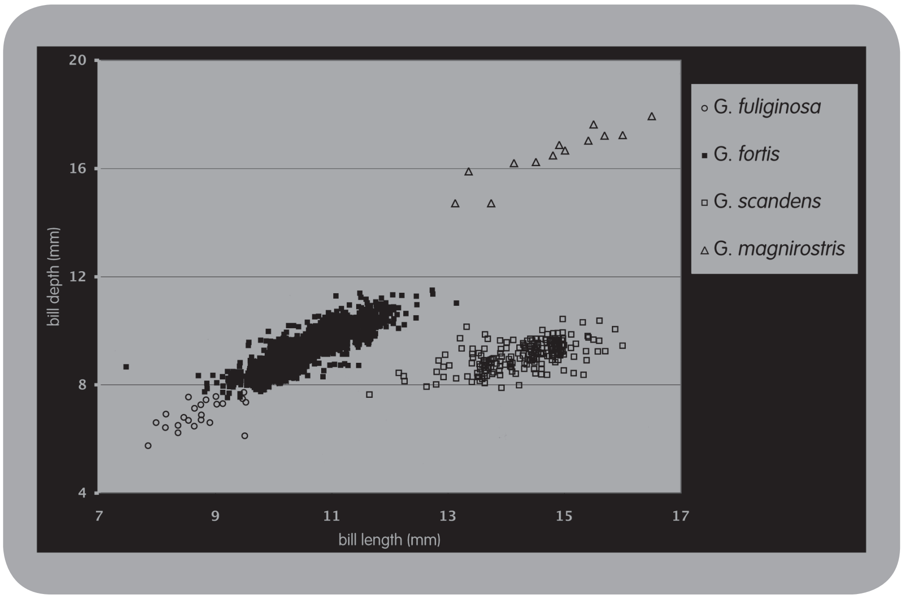
> Life on the Galápagos is often feast or famine. The islands straddle the equator 1000 miles west of Ecuador in the Pacific Ocean, but are no tropical paradise.



Rainfall on Isla Daphne Galápagos, redrawn from B. R. Grant (2003). © T. Constable.



Beak depth plotted against beak length for all measured finches on Daphne. Redrawn from P. R. Grant (1993). © T. Constable.

The natural environment of the Galápagos

Life on the Galápagos is often feast or famine. The islands straddle the equator 1000 miles west of Ecuador in the Pacific Ocean, but are no tropical paradise. The landscape is arid because of the very low annual rainfall, typically less than 500mm. This, coupled with the free draining volcanic rocks, means that there is very little surface water, either lakes or streams, on the islands. Vegetation is sparse and birds can soon exhaust the small supply of seeds. The lower lying areas of the islands are arid with cactus species such as *Opuntia* and small deciduous trees of incense and various spurges (*Euphorbia sp.*). Higher up, around 180-400m there is a little more rainfall and the arid landscape gives way to parkland and woodland habitats. Herbaceous plants as well as trees are found, and some of these are the first to colonise the lava flows, cinder and ash deposits from the volcanoes.

Higher still, the rainfall is again lower. Here the trees are replaced by dense shrubs which survive on water from cloud mist that envelopes these mountains.

The climate is dominated by the unpredictable cycle of El Niño events which occasionally bring warmer waters and higher rainfall. In one unusually wet year, 1359mm of rain was recorded (Grant and Grant, 1992). When this happens, plant life flourishes very quickly and the finches start laying eggs within about a week of the first rains. There are successive broods of nestlings as they benefit from the abundance and variety of seeds. On the return of the cold waters and low rainfall in La Niñas years, the finch populations again struggle to find food. This is 'life on the edge'!

Geospiza sp. – The finches of the Galápagos

There are 14 species of finches found on the Galápagos Islands. Like other finches around the world, they feed largely on seeds, flowers, buds, leaves, fruit pulp, nectar and insects. There is a large and continuous variation in shape and size of the finches and especially in the size and shape of their beaks (Grant and Grant 1983; Grant *et al,* 1976. Grant *et al* 1976). The variable natural environment is correlated with the large continuous variations in size and shape of the birds.

Peter and Rosemary Grant spent much time working with *G. scandens* and *G. fortis,* two of the ground finches, ringing them and making detailed records of mating, eggs, nestlings and fledglings. They chose a small island in the centre of the archipelago, Isla Daphne Major, for their work. This island has one of the lowest rainfall levels of all the islands of the Galápagos and in dry years it is virtually devoid of flowers and nectar, leaves, fruit pulp or small seeds. During the project, there were several cycles of El Niño and La Niña, so they could see the effects of both severe droughts and abundant rainfall on the finches (Grant 2003). In their writings they refer to the changes seen as "evolution in Darwin's finches". What exactly did they find?

Drought, famine and plenty – Is natural selection causing evolution?

The finch populations show a dramatic response to drought. The numbers of *G. fortis* can vary from under 100 birds to well over 1500 birds. In a severe year, 80% can die of starvation, but in a good year they lay up to six eggs in a clutch and can raise 8-10 broods, so populations can build up rapidly in a single season (Grant and Grant, 1992). Darwin's finches are unusually variable, especially in the size of their beak, and birds with certain beak sizes survive better than others during drought because they are more able to use the scarce food supplies remaining.

After rain, when food is more abundant, many species eat the same soft, easy to handle seeds and fruits (Smith *et al,* 1978). During drought, the medium ground finch, *Geospiza fortis* continues to look for small soft seed, but also tries to crack open the hard fruit of caltrop, *Tribulus,* for the seed inside. During the severe drought of 1977, around 85% of *G. fortis* died on the Isla Daphne Major (Boag and Grant, 1984). It was the larger individuals with larger beaks that survived because they could crack open the caltrop fruit. The smaller birds starved to death. The larger birds bred in subsequent years and not surprisingly, the offspring were similar to the size of their parents, larger than the average size before this severe drought. In contrast, the smaller *G. fortis* survived during the droughts of 1985 and 2005. At such times, the larger seeds were scarce but the small seeds of herbaceous plants were much more abundant (Gibbs and Grant, 1987).

Other finches on the Galápagos respond in a variety of ways (Boag and Grant, 1984). The large cactus finch, *G. conirostris,* specialises, feeding solely on the cactus plant when food is in short supply. Its survivors fell into two distinct groups within the one species, one group with a shorter bill length which cracked open cactus seeds and the other group with a longer bill that stripped bark (Grant 1985). The cactus finch, *G. scandens,* remained a specialist in drought years,

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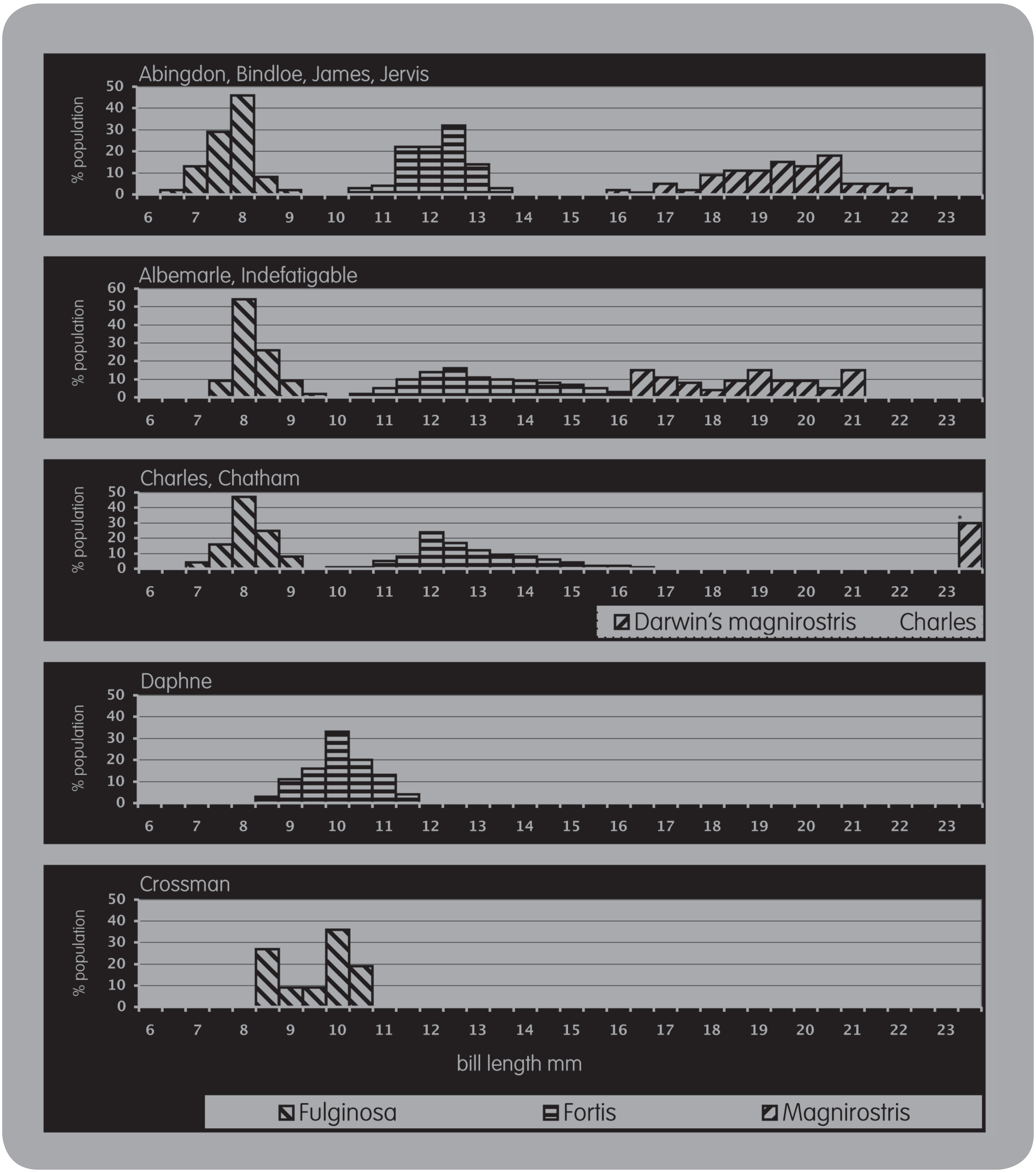

Illustration redrawn from Lack (1947) showing histograms of Geospiza bill depth distributions on the Galápagos. © T. Constable.

Measurements in mm are placed horizontally and the percentage of specimens of each size vertically.
*(Too few specimens are available for a histogram of G. *magnirostris* on Charles)

out-competing other finches trying to feed on cactus. It was not the smaller or larger individuals of this species that survived best, but those of average size. A quite different response is seen in *G. fuliginosa,* the small ground finch. It leaves Daphne Major for other islands where there is higher rainfall and a greater variety of food in times of drought.

Changes in body size and in the size and shape of the beak between years of drought and rainfall are rapid, showing conclusively that the variation is already present in the population (Burns *et al,* 2002; Rice and Pfennig, 2006). The changes are merely the loss of those finches that cannot survive. This is no mechanism for the evolution of life from simple to complex. Natural selection is merely a sieve. Some modifications are retained, others are lost. Nothing is new!

Darwin's finches – sizing up the competition

There is an interesting patchwork in the distribution of the finch species across the islands which can be explained largely by the different habitats and the competition between finch species. Not every finch is found on each island, usually only two or three species. We might expect that a particular finch species would have the same range of body and beak size and shape on each island where it is found, as these are characteristics used to distinguish the various species. However, this is not the case. On islands where *G. fuliginosa* is absent, *G. fortis* has a smaller bill depth and similarly, *G. fuliginosa* is larger where *G. fortis* is absent. Known as 'character release', the variation in these species allows them to fill the gap of the species that is absent. There is a character shift and the whole population becomes larger or smaller. This shows us that there is no clear and stable boundary between the species (Boag and Grant 1984 from Lack 1947). The Grants have seen similar changes happening recently. The large ground finch, *G. magnirostris,* colonised Daphne Major from 1982. About 20 years later, *G. fortis* has shown a marked shift in beak size towards prevalence of the smaller beaks, probably because *G. magnirostris* is out-competing the larger *G. fortis* when searching and breaking open seeds for food.

There are two issues here. Firstly, a finch species is not the same wherever it is found. The presence of one finch species can change the size of another through competition for food when it is present. We have already seen that climatic conditions can change the size distribution of finches in the above section. The term 'species' seems as stable as shifting sand! The second important issue is to consider how much overlap in variation must there be before two species should be reclassified as one? Just because the two forms are readily distinguishable where both occur, does that mean that they are two separate species, when on other Galápagos islands their size is intermediate?

Breeding habits – are there really 14 species?

Interbreeding between the finches occurs rarely (<5%) but consistently over the years (Grant, 1993; Grant and Grant 2003; Grant and Grant 1994; Grant and Grant, 2008). All combinations of ground finches, *G. fortis, G. magnirostris, difficilis and G. conirostris and G. fuliginosa* are known and similar interbreeding occurs amongst the tree finches and warbler finches as well (Grant, 1986).

There are a number of barriers to breeding in the ground finches: song recognition, the appearance of the bird, especially the size and shape of the beak, and limits in food supply. These barriers are usually strong, but in years following drought when numbers are low and food supply is plentiful, they tend to break down and interbreeding becomes more common. Hybrids are intermediate in size and less specialised in their feeding. All are entirely viable and fertile and their reproduction is as good, or better than non-hybrids in these years (Boag and Grant, 1984; Grant and Grant, 1996; Grant and Grant, 2002). There is no evidence of movement towards fusion or separation of these ground finches. Rather, there seems to be an oscillation between interbreeding

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and separation (Grant, 1993; Grant and Grant 2004) – much like the climatic swings between high and extremely low rainfall. This interbreeding may be surprising to those who have always thought that the term ‘species’ was well defined to include clear differences between the plant or animal and a total lack of interbreeding. In practice, it is not so simple. When Linnaeus systematically classified many plants and animals in the 18th century, he did not check for interbreeding and few have done so since.

There are a number of definitions of the term “species” (see boxes 1-3) but none is universally accepted in biology. There are many examples of interbreeding between species, about 1 in 10 birds are thought to hybridise (Grant and Grant 1992b) and there are many reports from other animals, such as bears and snakes as well as many plants. Some estimate that up to 40% of plants can interbreed. Creationists regard hybridisation data as an important indicator that both parental species derive from a common ancestor. Thus, we are entirely comfortable with the thesis that these finches are all related, with speciation within an ancestral breeding population.

Song

Song is one of the main barriers to interbreeding between finches, although appearance overrides that at close distance. Females mate with males singing a similar song to their own father, but the barrier is leaky because of mis-imprinting of fledglings by the song of a neighbouring male and also because of the similarity between different species eg *G. fuliginosa* and *G. fortis*. On the other hand four distinct song types are known in *G. fortis* and two in *G. scandens* which could divide up the species further into different breeding groups. Here we can see one way in which both interbreeding and separation of the species can occur in different years. (Millington and Price, 1985; Grant and Grant, 1996)

Genetic and biochemical evidence

The textbook explanation of Darwin’s finches is that these species diverged from the first arrivals as they spread out across the islands into different habitats. Comparison of a whole variety of enzymes, mitochondrial and satellite DNA show enormous similarity between all of Darwin’s finches (Ford *et al.* 1971; Freedland and Boag, 1999 a and b; Polans, 1983; Sato *et al,* 1999). This supports the view that they are all descended from a common ancestor (Petren, Grant and Grant, 1999).

However, the results also show complex interrelationships. Some groups of genes (haplotypes) are found in individuals across the four ground finches rather than restricted to single species. Sato *et al* (1999) comments that the results for all

Box 1
Groups of actually or potentially interbreeding natural populations which are reproductively isolated from other such groups. Some members of two populations may interbreed yet remain distinct either in their appearance or genetic makeup. Mayr, 1970

Box 2
A species comprises populations which exchange genes through interbreeding but which do not form fertile hybrids with others. Biglow, 1965; Key 1968; Barton and Hewitt, 1985

Box 3
A species is a cluster of organisms diagnosably distinct from other such clusters and within which there is a pattern of ancestry and descent. McKitrick and Zink, 1988; Cracraft, 1989

six *Geospiza* finches are comparable to taking a set of random samples from "a single randomly mating population" of a bird species. There is obviously a lot of gene exchange between them, "ongoing hybridisation between all six species" of (ground finches) and the wisdom of dividing them up into 14 different species has been questioned (Freeland and Boag 1999a). Gene exchange is not just between different species but also across genera. (Sato *et al* 1999 and Zink, 2002)

Evidence for evolution? Long term changes in the Galápagos finches.

Both *G. scandens* and *G. fortis* have become significantly smaller over the last 30 years independently of any short term changes due to rainfall. The ground finch *G. fortis* now has longer and sharper beaks, *G. scandens* has shorter and blunter beaks. This has been hailed as "evolution in action" by Peter and Rosemary Grant. However, the only thing that is happening is that interbreeding between these two pairs of species has transferred genes from one species to another. So, *G. scandens* is getting smaller as genes from *G. fortis* spread through the flocks and *G. fortis* is getting smaller as genes from *G. fuliginosa* spread through the *G. fortis* flocks (Grant and Grant, 2002; Grant P. R. *et al* 2004). So, far from new characteristics emerging that might lead to new species of finches with novel characteristics, here we see pairs of finch species becoming more similar to each other as they exchange genes.

Discussion

There are 14 species of finches *Geospiza* listed for the Galapagos. The ground finches *Geospiza fuliginosa, G. fortis,* and *G. scandens* have been observed, netted, tagged and measured over 30 years and they provide the evidence that the total range of beak size and shape of the 3 species of ground finches taken together has not changed over this time.

There is much fluctuation in the abundance of various sizes and shapes and constant de-selection (death) of those unable to survive the harsh conditions. No new features emerged that might be considered 'evolution in action'. Dig a little deeper and we find that each species is in a state of constant flux depending on rainfall, the presence or absence of competition from similar species, and hybridisation between one and another. Hybridisation in seasons of abundant rainfall and food, separation in drought and limited food counter inbreeding and enable survival in drought. These processes provide a buffer against extinction, but no evolutionary progression.

We would expect any two species to be recognisably different from each other. This is not so in Darwin's finches. Measurements of the ground finches show more or less continuous variation in body size, bill size and shape across these six species (Grant, 1993). Some beak sizes and shapes are far more common than others. These correspond to the four species which in turn correspond to those bill sizes and shapes best suited to feeding on the different plants.

So, the dividing lines between "species" of Darwin's finches are far from clear. Some authors suggest reducing the number of species on the Galápagos to 6 or even fewer (Grant 1986). If we add to this the lack of agreement between biologists about the definition of a species, then we must conclude that species as a level of classification can be no more stable than shifting sand. It is not a good foundation for any model of creationist biology.

The division of finches into species does provide an interesting opportunity to track changes in the population of finches on the islands and I would suggest that here we have a useful microcosm of the post Flood world. The original Genesis Kinds would be exposed to some harsh and varied environments quite different from the pre Flood world. In each environment, the variation in each created Kind is sieved out and only those able to find enough food and breed will remain and survive. Different ones survive in different environments. This is provision inbuilt by God for survival in the post Flood world.

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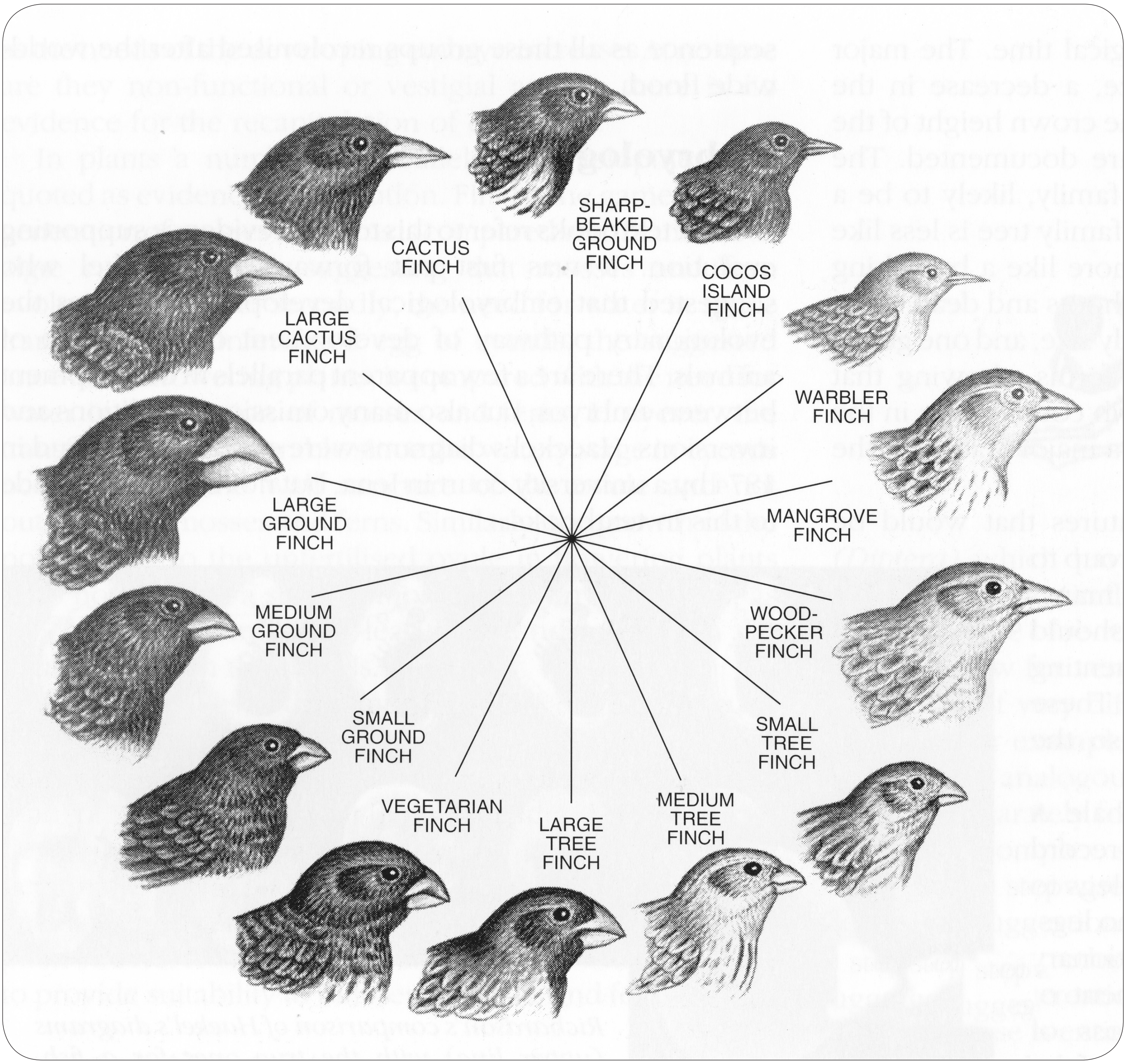
Conclusion

The evidence from recent research on the Galápagos shows that the variation provides a mechanism for survival in a fluctuating environment. There are changes in size with fluctuating food availability. Also some individual species are different sizes on different islands depending on competition from other finches. This means that there is no clear or stable boundary between the species. Some authorities suggest that there should be six or less designated species, not 14.

Further, there is no evidence for the emergence of new characteristics that would support the extrapolation from Darwin's finches to the evolution of all life forms from a common ancestor. ■



Variation in Darwin's finches. © S. Coleman.

Note

Todd Wood's monograph on the Galápagos (2005) has been very useful in the writing of this article. It provides detailed discussion of the finches and other animals of the archipelago and can be recommended for further reading on this topic. Certain additions to the points he makes there have been possible because of more recently published scientific papers on the subject.

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Philip Snow, who has provided the illustrations of finches for this article would like to clarify a point from Origins 46:

He would like to point out that, whilst he accepts most of the critique of his DayOne 'The Design & Origin of Birds' book, he did not make a mistake in stating that the Black-tailed Godwit's [Limosa limosa] bill is 'slightly upturned', as the reviewers suggested.

Unfortunately, many field guides do wrongly show the Black-tailed with a straight bill but this is not so. The Bar-tailed Godwit [*Limosa lapponica*] which has an even more upturned bill would have been a better comparison. snowart@tiscali.co.uk

The conflict between Mendel and Darwin

Marc Surtees

Garden Peas. © iStockphoto.com/chang.

Introduction

Today we are told that genetics is central to the theory of evolution and that both Mendel and Darwin contributed to the understanding of how evolution works. In the modern version of evolutionary theory (the modern synthesis) there is no conflict between the fact that genes reliably transmit information from generation to generation, while at the same time being the agents of change which drive evolution. Given enough time, we are told, genetic changes produce new species and can eventually produce new features and new types of plants and animals. Indeed the synthetic theory of evolution appears to have successfully incorporated the theories of Mendel and Darwin. Furthermore, some have claimed (Fisher, 1936 and de Beer, 1964) that there never was any conflict because Mendel was a supporter of the theory of "descent with modification" (the original term used by Darwin to describe his new theory).

> “Today we are told that genetics is central to the theory of evolution and that both Mendel and Darwin contributed to the understanding of how evolution works.

However, others have reported that careful reading of the original work of Mendel and his correspondence, as well as the type of experiments he conducted, shows that Mendel was opposed to the theory of descent with modification. Callender (1988) and Bishop (1996) present very convincing arguments to support the view that Mendel's work was in opposition to Darwin's new theory.

The aim of this paper is to present

a summary of the work of Callender and Bishop and to suggest some lessons that we can learn from the debate. As will become clear the author of this article agrees broadly with Callender. The reader is referred to Callender's paper, as well as that of Bishop if they wish to further examine the evidence.

The conflict between Mendel and Darwin

Darwin and Mendel had very different theories of inheritance (the term genetics was not invented until the early twentieth century). Darwin, to support his theory of descent with modification, initially proposed the theory of blending inheritance (Darwin, 1859) which he later replaced with the theory of pangenesis (Darwin, 1868). Mendel was concerned with the question of hybridisation. Breeders had already reported that some plant hybrids were different from the parent plants and true-breeding (constant hybrids) while other species formed hybrids which did not breed true and became like one of the parent plants after a few generations (variable hybrids). The aim of his experimental program on the garden pea (Pisum) was to understand how characters were passed on to hybrid offspring. Later he carried out further experiments with hawkweed (Hieracium) starting with a hybrid which he produced by crossing *Hieracium praealtum* with *H. stoloniferum*. Mendel's objective was to determine laws of inheritance which explained the breeding of both constant and variable hybrids.

> “ [they] present very convincing arguments to support the view that Mendel's work was in opposition to Darwin's new theory.

Hieracium pretense. © Tyler Olson, Dreamstime. Mendel also worked with Hawkweed, a similar plant to this one.

> “ Darwin and Mendel had very different theories of inheritance.

Darwin's theories of inheritance

Darwin initially proposed a theory of blending inheritance: the offspring had characteristics which were a result of blending the characteristics of each parent. However, he soon realised that this was not workable because the characteristics which are passed on by each generation will rapidly be diluted out and no changes would occur.

Later he developed an alternative, called pangenesis, by which body cells produce gemmules which collect in the reproductive organs prior to fertilisation. Darwin suggested that the gemmules came from every part of the body and that they could be modified by environmental factors. Thus, every cell in the body contributes to the phenotype of the offspring and the result could be modified by the conditions in which the animal lived. Darwin also believed that his theory of pangenesis could explain atavisms (when the offspring do not resemble the parents but are similar to a more distant ancestor). He proposed that they arise due to the awaking of long-dormant gemmules. Another phenomenon which Darwin thought he could explain with his theory of pangenesis was limb regeneration which he suggested was due to the activation of gemmules from the missing limb which circulate in the main part of the body.

This is a theory of inheritance of acquired characteristics and is in essence Lamarckian because it involves the transmission of acquired changes to offspring as a source of the slight variations which were acted upon by natural selection. Lamarck suggested that evolution was the result of offspring inheriting changes which occurred in a parent. For example, according to Lamarck children of a Olympic weight lifter would be strong and muscular, because they would inherit big muscles from their parent. In passing it is interesting to note that the fact that Darwin was a Lamarckian is generally not mentioned in discussions of evolution. It was this great weakness of Darwin's theory which resulted in the debates of the early 20th century which were resolved by incorporating genetics into evolutionary theory to produce the neo-Darwinian theory of evolution (see below).

Mendel's contribution

Mendel was interested in the question of hybridisation and whether or not it could result in new species. It is not clear if Mendel was trying to disprove Darwin, but his work certainly presented a challenge to Darwin because it shows that Darwin's theory of gemmules was wrong. Mendel was taking forward the work of other scientists who had been investigating the two main types of hybrid plant forms: variable hybrids and constant hybrids.

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> It is not clear if Mendel was trying to disprove Darwin, but his work certainly presented a challenge to Darwin because it shows that Darwin's theory of gemmules was wrong.

The hybridists were active during the 18th and 19th century and concerned themselves with the question of whether or not plants could successfully hybridise and produce new species of plant. Linnaeus, who was one of the earliest to investigate hybridisation, was initially a strict adherent to the idea of fixity of species. However, he modified his views as a result of observations of natural hybrid plants and was one of the first to suggest that hybridisation was possible. This was a modification of the doctrine of special creation which was resisted by other workers in the field such as Koelreuter and Gaertner. Neither doubted the fact that hybrids could be produced, but they maintained that these hybrids could not persist. Either they were sterile, or after a relatively small number of generations the hybrids reverted to either one of the original parent species. Koelreuter in his study of fertile plant hybrids had observed two processes which proved to his satisfaction that Linnaeus was wrong. These processes were known as reversion and transformation. Callender is careful to point out that a correct understanding of what Mendel understood by reversion and transformation is essential to a correct interpretation of Mendel's experiments.

Reversion occurs in hybrids which produce offspring by self-fertilisation. Koelreuter observed that the offspring of a self-fertilised hybrid more closely resembled one or other of the original parents than the hybrid itself. He also observed an increase in fertility. Therefore a population of hybrids would very rapidly give rise to one of the original parent plants.

Transformation involves cross-fertilisation with the pollen of one of the original parent species. This is the same thing as repeated back-crossing. In this case each generation is also found to more closely resemble the plant from which the pollen was obtained than the hybrid, until the offspring are indistinguishable from the plant providing the pollen. Clearly transformation is not "descent with modification". Koelreuter defined it as the transformation of one parent into the other. That Mendel used the term in this sense is clear from his use of the word transmutation to describe Darwin's new theory when he referred to it in his paper on the Hawkweed (Mendel, 1870). However, there are a number of prominent evolutionists who appear to have been unaware of the difference between transformation and evolution and consequently they concluded that Mendel was an evolutionist.

As we have seen the context of Mendel's experiments was the debate concerning hybrids, which was one of the big questions being discussed by biologists at the time. Darwin devotes a whole chapter to the subject in "The Origin" and expressed the view that Gaertner was wrong in his assertion that constant

Monk Gregor Mendel.

hybrids were impossible. Mendel's experiments were carried out with the aim of answering the question of whether or not hybridisation was a mechanism which can produce new species. Mendel may also have been trying to find out whether hybrids could tell him anything about the idea of descent with modification. This is why he was concerned to study both variable and constant hybrids. The behaviour of variable hybrids is important with respect to the phenomena of reversion and transformation. Mendel used the pea for his first series of experiments and, as is well known, found that the hybridisation of different varieties of peas produces first generation (F1) offspring which are all the same. Conversely, the second generation (F2) offspring, produced by self-fertilisation, are variable. From these experiments Mendel derived his law valid for *Pisum,* which is in two parts. First the "law of simple combination of characters" and second, the "law of combination of different characters". What Mendel showed was that he could predict the outcome of a cross between two plants each with a character which was different (for example yellow peas or green peas) by assuming that these characters were carried on separate units (now called alleles). He could do this for plants which differed in just one character and plants that had two different characters. More importantly Mendel demonstrated that variable hybrids show the phenomenon of segregation of the characters (alleles) and that this explains reversion. Mendel explained his law as follows: "the hybrids produce egg cells and pollen cells which in equal numbers represent all constant forms which result from the combination of the characters brought together in fertilisation" (Mendel 1866). Mendel's use of the term "constant forms" shows that he considered his law falsified the idea of descent with modification.

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> It was this great weakness of Darwin's theory which resulted in the debates of the early 20th century.

Later Mendel conducted experiments with Hawkweed (Mendel 1870). He used this plant because it was recommended to him as an example of a species which produces constant hybrids which do not show the phenomena of reversion or transformation. Unfortunately no-one at the time realised that Hawkweed reproduces asexually and as a result the offspring are exact copies of the parent. Therefore, it is not surprising that the hybrids appeared to be constant and confounded the expectations of those who believed that constant hybrids did not exist. Mendel carried out a whole series of experiments with Hawkweed in an attempt to derive general laws applicable to both constant and variable hybrids. His failure to do so was, in large part, due to the fact that he was not dealing with hybrids after the F1 generation. Nevertheless, Mendel was still endeavoring to derive laws of inheritance of discrete characters. These characters were believed to be passed unchanged from generation to generation and were described by Mendel as constant elements which today we call genes.

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> Mendel's experiments were carried out with the aim of answering the question of whether or not hybridisation was a mechanism which can produce new species.

The views of Callender and Bishop are also shared by other commentators. Here we will only mention Loennig (2001), because he is German and able to read the original German texts which Mendel wrote. Therefore, he should be less prone to the errors resulting from misunderstanding and dependence on translations. Loennig writes that: "Mendel's ideas on heredity and evolution were diametrically opposed to those of Darwin and his followers. Darwin believed in the inheritance of acquired characters […] and most important of course, continuous evolution. Mendel, in contrast, rejected both the inheritance of acquired characters as well as evolution. The laws discovered by him were understood to be the laws of constant elements for a great but finite variation, not only for culture varieties but also for species in the wild."

Furthermore, Loennig points out that Mendel incessantly speaks of "constant characters", "constant offspring", "constant combinations", "constant forms",

> Darwin believed in the inheritance of acquired characters […] and most important of course, continuous evolution. Mendel, in contrast, rejected both the inheritance of acquired characters as well as evolution.

"constant law", "a constant species" etc. (in such combinations the adjective "constant" occurs altogether 67 times in the German original paper). He was convinced that the laws of heredity he had discovered corroborated Gaertner's conclusion: "that species are fixed with limits beyond which they cannot change." This, however, should not be understood to mean that Mendel believed in the fixity of species, but rather that the possibility for variation is limited. Creation biologists today would agree that variation is normal but evolution as understood by evolutionary scientists is not possible.

Mendel's laws of inheritance

Considerable debate surrounds the re-discovery of Mendel's laws of inheritance. The current version of Mendel's laws were invented by scientists who rejected Darwinian natural selection and pangenesis. This anti-natural selection group enlisted Mendel as one of the foot-soldiers in the attack on the Darwinists. It was during the early part of the 20th century that they invented Mendel's three laws, which are:

1. **The law of segregation**
   The alleles responsible for a character trait are separated during formation of gametes (ovum or sperm) and recombined during fertilisation.
2. **The law of independent assortment**
   Alleles for different character traits are distributed to the gametes independently of each other. So they are inherited independently.
3. **The law of dominance**
   One of the alleles is dominant over the other. That is, only one will be seen in the offspring. For example, peas will be green and not yellow if both alleles are present.

These laws were never defined as such by Mendel, but were derived from Mendel's work by his "re-discoverers" to support their anti-Darwinian views. The story of the great neglect of Mendel was also an invention of the "Mendelians", which they used as a rhetorical device to advance their cause. The Mendelians suggested that biologists had ignored Mendel's work, or that it was suppressed. They were in effect trying to claim the moral high ground, in their struggle with Darwinists. However, the fact that Mendel's work was available in a variety of publications suggests that there was no conspiracy.

The evolution of the modern synthesis

At the beginning of the 20th century Mendelians, such as Bateson and de Vries, argued that Mendel's laws show that Darwinian natural selection could not work. Darwinian evolution is a process of the gradual accumulation of small (largely imperceptible) differences, over many thousands of generations. Mendel's experiments showed that one generation could be very different from the previous generation. Furthermore, the discrete characters (alleles) were still present and could reappear in the next generation. Therefore de Vries proposed the new mechanism of mutation by which organisms evolve and which did not contradict Mendel's Laws. This process was rapid and had no need for the numerous intermediates required by Darwin's slow and gradual process of evolution.

The supporters of Darwinian natural selection were led by Pearson and Weldon. These were the biometricians who focused on the measurement and statistical analysis of variation within groups of organisms. They laid the foundation of population genetics. Finally, the struggle between the Darwinist biometricians and Mendelians was resolved following the development of gene theory, the discovery of the role of chromosomes in inheritance and the developments of population genetics. The result was that both Mendelian and evolutionary genetics became part of neo-Darwinism.

Thus, evolutionary theory has itself evolved and although the term Darwinism is commonly used today to describe evolutionary theory, strictly speaking this is the theory of evolution by the inheritance of acquired characteristics and the mechanism of natural selection. Darwinism was replaced by neo-Darwinism which resulted from the reconciliation of Darwinists and Mendelians and put genetic theory and Mendel’s laws at the centre of evolutionary theory. According to neo-Darwinian theory, natural selection is the process that alters the frequency of genes (including mutated genes) in a population and causes evolution.

This in turn was found to be too restrictive and has been replaced by the modern synthesis which includes other processes alongside natural selection, such as sexual selection, but also random genetic drift and gene flow, which are believed to contribute to evolution. Hence, the role of genetics in modern evolutionary theory has become even stronger and provides what was lacking in Darwin’s original theory of natural selection.

Genetics and evolution today

It is interesting to note that Mendel’s theories still stand as a special case of inheritance, although due to linkage, recombination and other complexities of the genome, they are not generally applicable. The robustness of Mendel’s work is surely due to the fact that it was based on data collected by experiment. However, Darwin’s original theory of blending inheritance had to be jettisoned because it was entirely wrong, something which Darwin himself recognised when he proposed his modified theory of pangenesis, which was in turn shown to be false by the Mendelians of the 20th century. This shows us the danger of proposing *ad hoc* theories to protect one’s preferred worldview, when the evidence demands otherwise. This is a lesson that both creationist and evolutionist will do well to learn.

Has the modern synthesis with its reliance on evolutionary genetics resulted in a robust theory which explains the origin of biological life and its diversity? Interestingly, it is not only scriptural biologists who question the modern view. Some evolutionary biologists also suggest that the modern synthesis is actually rather deficient.

Mueller and Newman, in their introduction to the *Origination of Organismal Form* (2003), write that: ”Evolutionary biology arose from the age-old desire to understand the origin and the diversification of organismal forms.” They suggest that even though the original Darwinian mechanisms of ”variation of traits” and ”natural selection”, have been refined in the modern synthesis to incorporate the modern understanding of genetics and selection acting at the population level, with a sophisticated, mathematically based population genetics, something is still lacking. Mueller and Newman also point out that:

> ”much of present-day evolutionary theory is concerned with formal accounts of quantitative variation and diversification. Other major branches of evolutionary biology have concentrated on patterns of evolution, ecological factors, and, increasingly, on the associated molecular changes.”

The focus on the gene and evolutionary genetics, they say, ”has overwhelmed all other aspects of evolutionary biology.”

As a result, the question of why and how certain forms appear has been largely forgotten. To quote Mueller and Newman; ”The causal question concerning the specific generative mechanisms that underlie the origin and innovation of phenotypic characters” has not been answered. We believe that there is no purely naturalistic explanation, so it is not surprising that evolutionary biologists have been unable to provide an answer.”

Furthermore, Mueller and Newman add:

> ”Modern genetics […] purports to provide answers to the question of causation, but these answers turn out to be largely restricted to the proximate causes of local form generation in individual development. The molecular mechanisms that bring about biological form in modern-day embryos, however, should not be confused with the causes that led to the appearance of these forms in the first place.”

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It is interesting to note that Mendel’s theories still stand as a special case of inheritance.

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This shows us the danger of proposing ad hoc theories to protect one’s preferred worldview, when the evidence demands otherwise. This is a lesson that both creationist and evolutionist will do well to learn.

It is true that the modern synthesis with its understanding of mutation and natural selection, small changes and shifts in gene frequency, provides much that can help us to understand biological variation, but it cannot, in the words of de Vries, "explain the arrival of the fittest." (1906).

In conclusion, we would suggest the following. Firstly, Mendel was not an evolutionist and his experimental work showed that Darwin's theory could not work. Secondly, the attempt to rescue Darwinian evolution with genetics and molecular biology has not in fact changed anything because there is still no natural explanation for new biological functions, features and types of animal. Therefore, it appears that the very success of the modern synthesis, with evolutionary genetics at its centre, has led biology into an evolutionary dead-end! ■

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> It is true that the modern synthesis [of evolution theory] with its understanding of mutation and natural selection… provides much that can help us to understand biological variation, but it cannot… "explain the arrival of the fittest."

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Darwin and the theology of evolution

J H John Peet

According to Richard Dawkins, as a result of Darwin's theory of evolution, theology is a dead academic discipline and, with it, God is a delusion. Probably few would agree with him completely, but he has had a tremendous influence. In contrast, Darwin would not go so far. Though his autobiography (Darwin, 1958) indicates his problems with Christian theology, he concludes that he must describe himself as an agnostic, rather than an atheist. Of course, this leaves us bewildered as to why Darwin should be commemorated in a church, Westminster Abbey!

Then there are those who describe themselves as "theistic evolutionists". We confine ourselves here to those of the Christian community as the Bible and theology have no relevance to non-christian religions. Theistic evolutionists can be divided into those who hold to a liberal theology (and so are sceptical about the reliability of Scripture) and those who would claim to be evangelicals. The latter group are distinguished from main stream evangelicals who hold to biblical creation by their commitment to scientific concepts above biblical teaching. For them, the Bible must be interpreted in the light of current scientific philosophy. This, of course, is in contrast to the Christian founders of modern science and in conflict with traditional evangelical teaching on the authority of Scripture.

> "It is our conviction that God has revealed plainly His miraculous and providential works in creation. God is fully capable of revealing the truth of creation (or evolution?) to mankind.

Picture of Stupa at the Killing Fields, Cambodia.
© iStockphoto.com/mark3mark.

Ironically, it was a liberal theologian who recognised the serious implications of Darwinism for our theology of salvation. 'Evolution is now approaching the citadel of our Christian faith. It is affecting Soteriology and Christology' (Wilson, 1925).

"Biblical creationists" do respect scientific discovery and thinking (indeed, many of them are professional scientists), but hold to the inerrancy and infallibility of Scripture. It is our conviction that God has revealed plainly His miraculous and providential works in creation. God is fully capable of revealing the truth of creation (or evolution?) to mankind. Because of His nature, we must accept His revelation in these, as in other, matters. We adhere to the belief that we must take Him and His word as our authority rather than the ideas of 19th-21st century human-beings. In fact, if the creation account in Genesis is not fully trustworthy, we have extensive problems in our doctrines (Peet, 2003 and others by the same author) and in the reliability of the rest of Scripture.

So, what are the issues that we face when we consider theology and evolution?

Darwin and his view of God

In a sense, none of Darwin's comments on God (and other biblical issues) would surprise anyone involved in Christian ministry. They are as old as mankind! He comments, "I had gradually come … to see that the Old Testament from its manifestly false history of the world … and from its attributing to God feelings of a revengeful tyrant, was no more to be trusted than [other] sacred books or the belief of any barbarian." He goes on to talk of everlasting punishment as a "damnable doctrine".

This is the common fallacy, even of learned people such as Dawkins today, that we can define God, His nature and His ways by our conceptions of what He should be like. Further, we see how incidents are taken out of context to portray our God in such a way. We need to see the true nature of mankind and the true nature of God to understand (albeit in a limited way) the reason for the Lord's actions. Darwin and his co-thinkers have a sanitized view of humanity. If we start with that, we will never understand the gospel and the mercy of God.

Darwin, of course, was not a scientist, but he uses his views of science as a tool against the God of Scripture. Like the modern anti-Intelligent Design lobby, he argued that "the more we know about the fixed laws of nature, the more incredible do miracles become." "Everything in nature is the result of *fixed* laws", he claims. We have to ask why the non-christian scientist should believe in fixed laws of nature – or, indeed, such laws at all! They cannot be argued for *ab initio* and can only be assumed on the basis of observation. But, even then, why do they exclude the miraculous? There is no basis in scientific thinking for their exclusion and certainly when we believe in God, they are perfectly feasible. This is a real problem to theistic evolutionists. Who or what is their God?

Darwin proceeds to the philosophical discussions on the causes of the "endless beautiful adaptations which we meet everywhere". He believes that these are the result of natural selection but that the driving force is "happiness" and, to some extent, suffering. He comes to "the belief that all sentient beings have been formed so as to enjoy, as a general rule, happiness." (Darwin, 1958; p.88)

Suffering is undoubtedly one of Darwin's primary problems. He speaks of the suffering of mankind and of the "lower animals" and sees no point or purpose to this. It is striking, to the thinking person, that the Bible deals with this issue from its third page. The causes and purposes of suffering are clear, even if somewhat mysterious to us as we seek to understand the nature of God. But the Scriptures also teach us about the new creation, for which the wider creation also longs, in which suffering will be banished through the work of God.

What we are seeing is that the theological issues thrown up by evolutionary theory are the result of an *a priori* rejection of Scripture.

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> We must be clear on our theology of Scripture before we can evaluate any scientific approach to life. The battle also, inevitably, centres on our God and our understanding of Him and His sovereignty.

However, having developed these various arguments, Darwin admits to facing a personal dilemma. He concludes his autobiography with these comments (Darwin, 1958; p.92-94):

> "Another source of conviction in the existence of God connected with the reason and not the feelings impresses me as having much more weight. This follows from the extreme difficulty, or rather impossibility, of conceiving this immense and wonderful universe, including man with his capability of looking far backwards and far into futurity, as a result of blind chance or necessity. When thus reflecting, I feel compelled to look at a first cause having an intelligent mind in some degree analogous to that of man; and I deserve to be called a theist."
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> "This conclusion was strong in my mind about the time … when I wrote the Origin of Species; and it is since that time that it has very gradually with many fluctuations become weaker. But then arises the doubt – can the mind of man, which has, as I fully believe, been developed from a mind as low as that possessed by the lowest animal, be trusted when it draws such grand conclusions? …"
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> "I cannot pretend to throw the least light on such abstruse problems. The mystery of the beginning of all things is insoluble to us; and I for one must be content to remain an Agnostic."

"God after Darwin"

This is the title of a book by John Haught (Haught, 2008), professor of theology and director of the Georgetown Center for the Study of Science and Religion. It is sub-titled, "A theology of evolution".
I am taking this as a typical position on this subject, though I recognise that there can be a variety of positions of theistic evolution, but I believe his general thesis reflects this group of Christians. (As we go to press we are aware of a new book, by Dr Denis Alexander, that needs specific consideration.)

One fundamental aspect of this text, which will not surprise biblical creationists but does indicate a flawed theology, is the way that his position is based on human philosophy and neglects Scriptural teaching.

His thesis seems to centre around his concept of the Intelligent Design approach, which he considers to be incompatible with scientific methodology. He sees a weakness of the ID approach to be that it "injudiciously passes over the disorderly, undirected aspects of evolution that are also a part of the life process." He claims that it fails to recognise that "life requires the dissolution of rigid 'design'". In fact, he says that Darwin's "gift to theology" is a recognition of the "tragic aspects of divine creativity".

Annie, daughter of Charles Darwin. Her death at an early age was a shattering blow to Darwin and pushed him away from God.

This work sums up the frustrations of so many of us: it ignores so much of what creationists and intelligent design protagonists actually say. It sets up a straw man and seeks to demolish that. It is a position many of us do not hold. It proposes a rigid definition of science which excludes the miraculous and Scriptural revelation. It accuses the ID movement of ignoring the problems of evil (to use the biblical analysis). It claims that neither creationists nor ID proponents recognise change over time. Until they get their facts straight, we cannot have productive dialogue and certainly their theology is flawed.

Haught says that: "the theory of natural selection is so theologically troubling." To whom? Certainly not to the biblical creationist.

Because these writers ignore Scripture in their development of theology, they miss the clear implications of Genesis 3 in explaining evil. Until they read our writings, they will continue to believe that we talk in terms of the "fixity of species", which we do not. We say that God created all things with the ability to adapt to changing environments *etc*. Genetic research demonstrates both the wonder of design and this created potential to variation.

Theology and Ethics

It is not surprising that theistic evolutionists and biblical creationists share common ethical standards; they come from our biblical heritage. Atheistic evolutionists also tend to hold to similar standards as demonstrated in the comments by Stephen J Gould and Richard Dawkins. Their perspective does, of course, come from their Christian environment. Richard Dawkins admits that we must reject the ethics of Darwinism. Gould (Gould, 2001) argues that "science" (specifically evolution) and "religion" exist in parallel non-overlapping domains (NOMA, non-overlapping magisteria) in which religion determines our ethical standards.

What is often overlooked by the evolutionists is the fact that non-Christian cultures often have very different ethical concepts both historically and in modern times. We conclude that our concept of right and wrong is not a natural, evolutionary one.

What is often overlooked by the evolutionists is the fact that non-Christian cultures often have very different ethical concepts both historically and in modern times. We conclude that our concept of right and wrong is not a natural, evolutionary one.

When it comes down to the basics, we see that they centre on the creationist accounts given in Scripture. In particular, the fact that man is not descended from apes, whether by evolutionary means or by God transforming primitive Stone Age creatures, but was purposefully made in the image of God. Remove that principle and we have removed the foundation for modern society as well as for wider Christian theology.

Conclusion

The theological battle centres on the Bible and our understanding of it. We must be clear on our theology of Scripture before we can evaluate any scientific approach to life. The battle also, inevitably, centres on our God and our understanding of Him and His sovereignty. This will lead us to evaluate carefully our concept of theodicy, God and His relationship to the evil in this world. In parallel we must critically examine our scientific theories on origins: are they scientifically valid and what is their relationship with God's own revelation of what He did? ■

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Darwin’s struggle with the problem of evil

Ray Trainer

One of the myths surrounding the theory of evolution in our day is its supposed separation from all non-scientific bias. It is accepted – and even strongly promoted by some – that evolutionary theory has far-reaching consequences for the meaning of life, but that the theory itself is not dependent upon any such non-scientific convictions. However, the irony is, though this understanding is asserted by many, the theory of evolution is heavily grounded upon metaphysics. Contrary to popular belief, all knowledge is based upon assumptions – whether identified or not – and Darwin’s arguments for his theory were driven not so much by impartial scientific analysis, but by problems arising from his own personal concept of the Creator. What is particularly interesting to note is that it is these same non-scientific arguments as expressed by Darwin which are also being used by scientists today as the mainstay of their own proofs for evolution.

The problem of “Nature, red in tooth and claw”

Effectively Darwin’s theory is a *theodicy,* that is a solution for the problem of evil. Darwin’s theodicy was primarily a solution not so much for moral evil within humans, but for natural evil within creation as a whole. Simply put: Darwin saw nature as “red in tooth and claw” and Darwin could not perceive of God creating (in a special-creation sense) the world in this way. In other words, Darwin had a specific, yet inaccurate view of how God would work. For Darwin, this incorrect image of God did not match up to the reality of the natural world in general and to evil within the natural world in particular.

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> Darwin saw nature as “red in tooth and claw” and Darwin could not perceive of God creating (in a special-creation sense) the world in this way.

For example, Darwin considered that special creation by a Creator necessarily implies an independence or a randomness of design which is not found within the natural world. Therefore similarity of design, which is clearly evident within the world around us, automatically implies common descent and not special creation. Similarly, Darwin believed that God could not be expected to micro-manage creation, creating all the detailed variation and complexity of life both independently and fully optimised. Darwin considered it utterly fanciful that “the shape of his nose was designed” (citation in Hunter 2001, p.63). Another misconception of God by Darwin was that, once created, God would not meddle with the universe. For Darwin, the implication of God continuing to be actively involved within creation would be that such a God is an imperfect craftsman. For Darwin, “everything in nature is the result of natural law.” (citation in Hunter 2001, p.121) Therefore – following Darwin’s reasoning – because God would not create the world the way it is, special creation is impossible. Of course, with special creation now being impossible, the theory of evolution necessarily becomes a fact. That, in a nutshell, is Darwin’s primary, but metaphysical argument for evolution.

However, in what specific way does evolutionary theory solve Darwin’s misgivings over God’s relationship to natural evil within this world? The answer to this question is straightforward. For Darwin the crucial ingredient is that God distanced himself from the universe by inserting natural laws in between. In practice God relinquished control over the universe to these natural laws. Of course, a side effect of these laws was to introduce natural evil into the world. Though God only created efficiency and harmony, the natural laws which God put in place became the source of natural evil. Do you follow therefore Darwin’s solution to the problem of natural evil within this world? Because God is *distanced* from the natural world by the insertion of natural laws, so God cannot be held *accountable* for natural evil.

Interestingly, this theodicy of Darwin with respect to natural evil is very similar to an often-proposed theodicy with respect to moral evil. In Darwin's day – and also today – many suggest that man's *necessary freedom of will* is the cause of moral evil. God sees what happens but does not, because of man's supposedly inviolable autonomy, influence it. In other words, because God is necessarily *distanced* from moral evil by man's free will, so God cannot be held *accountable* for man's actions.

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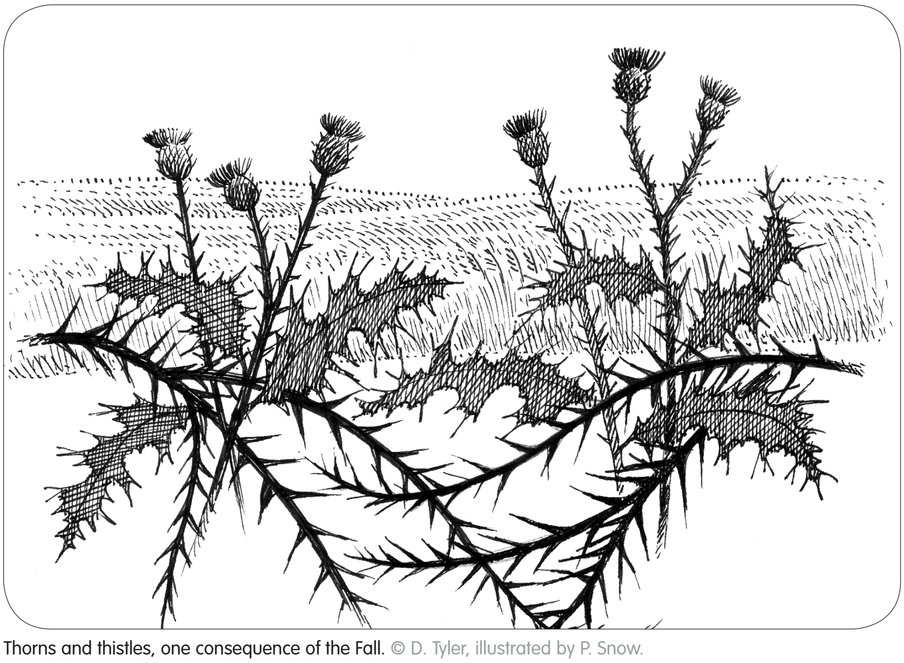
> To quote Richard Dawkins: "The universe we observe has precisely the properties we should expect if there is at bottom no design, no purpose, no evil and no good, nothing but pointless indifference."

Of course, this often-proposed theodicy for moral evil, as with Darwin's theodicy for natural evil, also proves to be inadequate. The Bible does not teach that creation, whether moral or natural, is outside of God's control. (Proverbs 16:33, Matthew 6:25-34, 10:29-31, Romans 8:28, Hebrews 1:3) The Bible's own solution for the problem of moral and natural evil is far more profound.[1]

Where does Darwin's solution for natural evil lead?

However, this mistaken theodicy of Darwin also brings in with it other far-reaching and serious consequences. *Firstly,* because God is considered to be disconnected or distanced from the physical world, the spiritual and the physical become mutually exclusive or non-overlapping realities. Science and religion are classified as independent of each other. One – science – is considered to be within the public arena; whereas the other – religion – is considered to be only a matter of private belief. Further, God's non-interference in the world is deemed obligatory in order for science to work correctly in practice. Any "unscientific" appeal to the supernatural – whether by a God-of-the-gaps argument or via Intelligent Design – is thought to ultimately stifle scientific curiosity and advance. In other words, the use of the supernatural within science (for example, the concept of Intelligent Design) is held to be not wrong, but simply improper! Now, this *naturalistic* worldview is obviously pervasive in our own day. However, what is the end result of this argument? Simply put: such a private and distant God as



Thorns and thistles, one consequence of the Fall. © D. Tyler, illustrated by P. Snow.

this ultimately becomes an irrelevance to our lives. Effectively, no theodicy is actually required because there is no such thing as evil. To quote Richard Dawkins: "The universe we observe has precisely the properties we should expect if there is at bottom no design, no purpose, no evil and no good, nothing but pointless indifference." (citation in Hunter 2001, p153)

A *second,* but related consequence of a non-interfering, distant God is a revival of both Gnosticism and Deism. Deism – a belief that God does not act in order to influence events within this universe – was prevalent in Darwin's day. God governs through natural law but not by supernatural intervention. Miracles are deemed messy, implying that God is flawed. In reality, Darwin – at least early on and like many of his contemporaries – was a Deist. Gnosticism – part of which is a belief that the material world is evil – also holds that God is thoroughly disengaged from this world. An utterly pure God must never be contaminated by any involvement with the material universe. As a result, we find no evidence for God within nature. This world runs *only* on secondary causes, and all natural phenomena are never the result of divine providence. Of course, both Deism and Gnosticism portray a God who is not the God of the Bible. The God of the Bible is fully engaged with his creation. "The Word became flesh and made his dwelling among us. We have seen his glory, the glory of the One and Only, who came from the Father, full of grace and truth." (John 1:14; see also Job 38-40, Psalm 19:1, Hebrews 4:15, 1 John 1:1-3, 4:2.)

Thirdly, Darwin's flawed theodicy may also lead to an open-theistic understanding of God. Open theists believe that the future doesn't exist and therefore cannot be known by anyone – including God himself. Now, evolution is seen to be independent of God, thus outside of God's control. As a consequence – with the evolutionary process fashioning an undirected natural and human history – God cannot predict anything that will happen. For Kenneth Miller this is the logical outcome of evolutionary theory. He writes: "Obviously, few religious people find it problematical that their own personal existence might not have been preordained by God … but strangely, some of the very same people find it inconceivable that the *biological* existence of our species could have been subject to exactly the same forces." (citation in Hunter 2001, p.171)

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> Now, evolution is seen to be independent of God, thus outside of God's control. As a consequence – with the evolutionary process fashioning an undirected natural and human history – God cannot predict anything that will happen.

Circular reasoning

So what can we conclude from this brief examination of Darwin's struggle with the problem of evil? Primarily, we can see that the overarching metaphysical implication of the theory of evolution – whether from an atheistic or a theistic viewpoint – is that God has no ongoing *active* role within nature. Therefore, evolution carries us inevitably towards naturalism. However, we can also see that, as well as having this serious metaphysical consequence, evolution itself rests foursquare upon a metaphysical premise – namely, that a Creator would not create the world the way it is. This is naturalism in another guise. Interestingly, this premise is still used today in order to bolster this struggling theory in the face of onslaught from many quarters. However, do you see the circular reasoning? While evolution carries us towards naturalism, naturalism itself is used as a justification for evolution. ■

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Note

[1] Clearly, this is a vast subject beyond the scope of this article, but see, for example, the argument of Elihu in Job 32-37; also consider Ephesians 2:6f, 3:10f.

Lion Kill. © iStockphoto.com/Natasha Chamberlain.

The Darwin Conspiracy – Origins of a Scientific Crime

by Roy Davies.

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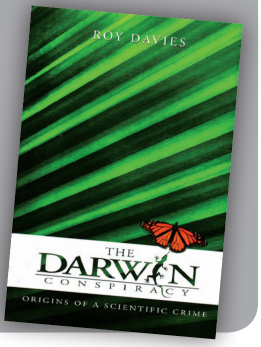
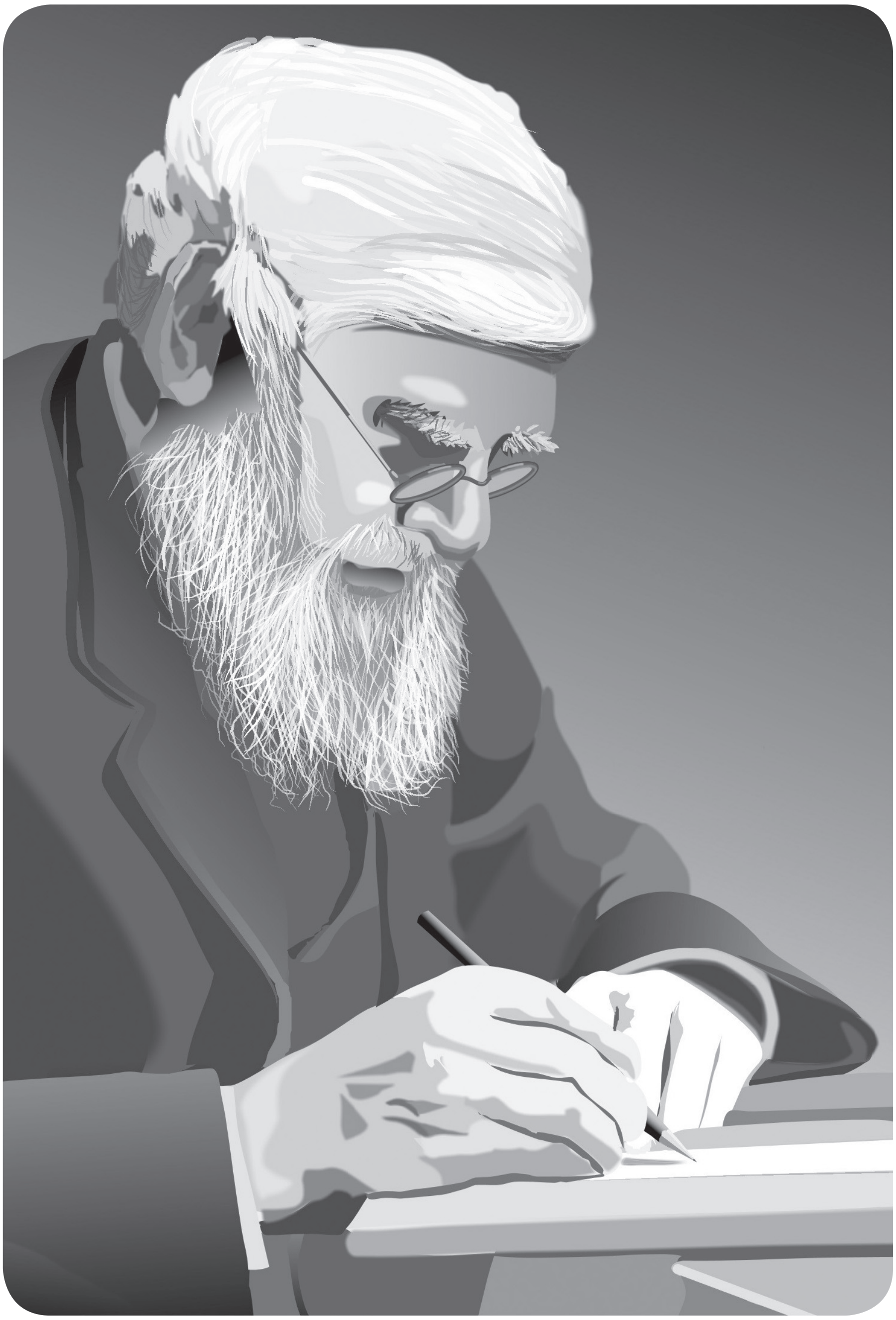
Reviewed by David Tyler




Alfred Russell Wallace. © Jack Lewis.

This publication marks the 150th anniversary of the joint presentation of Darwin and Wallace of their thinking about evolution by natural selection to the Linnean Society. The book is a blockbuster because it claims that "Darwin perpetuated one of the greatest crimes in the history of science". It concludes that Darwin plagiarised Alfred Russel Wallace, deceived the world about the maturity of his own ideas before 1858, and, to satisfy his personal need for glory, failed to give credit to scholars who influenced his thinking.

It needs someone with remarkable abilities to put together such a radical revision of history. The author's experience is in writing, producing and directing documentaries that challenge popular historical narratives. During the 1980s, he was responsible for a TV programme about Darwin that presented a story that was and is widely accepted:

> "Darwin [was] a nervous man who concealed the secret of how species originate for more than twenty years, until he was forced to publish when he realised someone else might get there before him. The programme was called *The Devil's Chaplain*."

Since that time, Davies has come to reject this account as iconic.

> "Today, having researched the Darwin record for myself and having been utterly convinced by what I have learned, I believe […] that the original programme (which went out under my name) left a great deal of new

> information about Darwin unmentioned. If I had known then what I know now, *The Devil's Chaplain* would never have been made. What you are about to read is the story leading up to the discovery of the origin of species, which I would eagerly have transmitted in its place."

Being a natural sceptic of conspiracy theories, I read this book cautiously – 'convince me if you can!' By the end, I was persuaded. What impressed me was the way Davies drew on the research of numerous Darwin scholars, showing that although they discovered important aspects of Darwin's life and work, they were unable to package their findings into a coherent whole. The person who came closest was Arnold Brackman, who concluded in 1980 that Darwin did plagiarise Wallace. It is the 'big picture' that Davies provides for the first time bringing coherence to earlier eye-opening research papers. These could be refered to as the Darwingate papers.

The papers behind Darwingate

The first researcher to be discussed in the book is Professor Darlington of Oxford University. He sought an answer to the question "by what thought process had Charles Darwin actually arrived at his ideas about evolution?"

> "Darlington pointed out that he could not find, in all the accounts of Darwin's work published up to that time, any suggestion that some original germ in Darwin's mind had led inexorably to the full development and enunciation of this big idea."

Darlington recognised that Darwin's writings bore the marks of rhetoric. For example, "Darwin's unawareness of what his contemporaries were thinking matched his unawareness of what his predecessors had written". This comment is highly significant for what comes later, because Darwin was very concerned about gaining precedence for his own ideas and he consistently referred to "*my* theory".

The second scholar is the anthropologist Loren Eiseley. He identified a mismatch between the time (October 1838) when Darwin read Thomas Malthus's *Essay on Population* (which Darwin claimed "Here then I had at last got a theory by which to work…") and yet 18 months earlier he was already making notes on the very same ideas? After noting many similarities between the way Edward Blyth reported data in his published articles and the wording in Darwin's notebook about these same phenomena, Eiseley came to the conclusion that Darwin had lifted Blyth's thinking about natural selection – without acknowledgement.

The book is a blockbuster because it claims that "Darwin perpetuated one of the greatest crimes in the history of science".

> "Eiseley believed, even making some allowance for the accidental use of the same sources, that the effect of his research was cumulative. He argued that these many similarities could not be explained by chance and that Darwin had plundered Blyth's articles for the ideas which underpinned the thinking that led to On the Origin of Species."

Barbara Beddall set out to refute Eiseley's suggestion that Darwin had plagiarised Blyth. She particularly wanted to find the letters between Wallace and Darwin – but found that some were missing. She also found, in the period 1853-8, that other letters to Lyell, to Hooker and to Asa Gray were lost. This, in her opinion, was "very odd". She came to the conclusion that they had been deliberately destroyed to obscure the record of how Darwin formulated his theory. She commented: "Without these letters, a clear idea of the extent of Wallace's influence on Darwin is beyond academic assessment and the full story impossible to gauge." But the jigsaw that Davies has assembled does have a clearer picture so that the significance of the missing letters is not "odd" but part of a pattern.

"The idea that it might have been Darwin himself [who destroyed the letters] seems not to have occurred to her."

Altogether, Davies features the work of nine researchers, with each contributing one or more pieces to the jigsaw. This review cannot do justice to the way the arguments develop. Here is just one more nugget. It concerns another letter of Wallace dated 2 March 1858. We know it was posted at the same time as his momentous letter to Darwin that contained the short paper that was presented at the Linnaean meeting on 1st July that same year. Darwin claimed the letter reached him on 18 June, the same day that he wrote to Lyell to say that Wallace could not have written a better abstract for Darwin's own work. However, as Davies shows, we now have a complete timeline for the transport of this letter from the Dutch East Indies to its arrival in the UK, and the date-stamped envelope of the other letter posted along with the letter to Darwin. These date stamps show that the letter arrived in the UK on 2 June – on course for delivery to the addressee on the following day. Davies writes: "The arrival of Wallace's letter on 3 June would have given Darwin more than enough time to digest its contents and make the two lengthy changes to the "natural selection" chapter of his manuscript. It would also have allowed him to claim that Wallace's ideas were replicas of his own."

Plagiarism unmasked

Most people coming across this for the first time will be incredulous, thinking that Darwin's ideas on evolution by natural selection before this time were well documented. Davies shows that this is erroneous. This is why his 'big picture' is so important: Darwin was like a man groping in the dark. He gathered data, hoping to find a synthesis, but theoretical ideas were elusive. When he came across other people's ideas that helped to make sense of the data, he gathered them as well, treating them as his own. The plagiarism of Wallace was not an isolated incident, but part of a pattern of behaviour.

There are really two conspiracies in this book. Lyell and Hooker played a significant role (not in plagiarising, but in engineering circumstances to favour their gentleman friend).

> "The members [of the Linnean Society] agreed that Darwin and Wallace should be acknowledged as co-discoverers of the theory of how species evolve, which would henceforth be known as the Darwin-Wallace theory of evolution. The crucial question of priority was settled by placing Darwin's name before Wallace's. Lyell and Hooker had successfully conspired to hand Charles Darwin the prize he had coveted for more than twenty years."

Wallace emerges as the real hero. He could easily be made a role model for young scientists. Davies refers to him as a "brilliant yet unassuming naturalist who was never to comprehend the full extent of the conspiracy enacted against him".

Was there a publication delay?

As a test of the conspiracy theory, I decided to compare the interpretation of events offered by Davies with a study of van Wyhe (2007). This is concerned with Darwin's apparent delay in publishing his theory, a delay that was accepted as a fact of history by Davies in *The Devil's Chaplain* (as mentioned in the first quote above). Did Darwin have the essence of his theory in his mind by 1844, when he drafted out an overview of his thinking? Did he hold back from publishing (as many think) or did he give priority to other topics before 1854 (as van Wyhe concludes). Alternatively, as Davies argues, was it necessary for him to wait until 1858 before he could publish because that was when he learned his key idea from Wallace?

Much of van Wyhe's paper is very useful for refuting hypotheses offered to explain why Darwin delayed publishing. Some have suggested that he was afraid of the reaction of his scientific colleagues but van Wyhe shows that those who knew about his interests were keen to see him publish. Others have suggested an aversion to upsetting family, friends or Victorian society, but comments made by Darwin in his letters show that he was not swayed by any of these potential influences. A third avenue of explanation has invoked psychological conflict about the implications of his theory, but again the evidence from correspondence is sufficient to rule this out.

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Wallace emerges as the real hero. He could easily be made a role model for young scientists. Davies refers to him as a "brilliant yet unassuming naturalist who was never to comprehend the full extent of the conspiracy enacted against him".

Van Wyhe denies that Darwin delayed publication. He claims that Darwin was a very methodical person who liked to finish one project before he started the next. After the Beagle voyage, he gave priority to publishing on topics arising from that. This took him to 1846, when he reached his last topic: the invertebrates. This was expected to take another year. Then, he wanted to embark on a 5-year project on "species and varieties".

However, the species work extended to 8 years because Darwin decided to work systematically through the barnacles (Cirripedia). Only when he had finished this in 1854 could he be free to start his species work, culminating after 5 years in *"On the Origin of Species"*. So, van Wyhe concludes, Darwin was on track, given the unforeseen expansion of his invertebrate studies.

If it is accepted that Darwin's thinking about the mechanism of evolutionary transformation was formulated before he formally commenced his species work, then van Wyhe's analysis effectively sweeps away the various explanations of Darwin's 'delay' in publishing. If, however, Darwin did not have a theory to work with, things immediately look very different. If this were the case, the Cirripedia work did not introduce delays but gave Darwin a 'doable' project while he continued to gather data and develop his thoughts.

This is where Davies' discussion of the development of Darwin's thinking about evolution by natural selection is of critical importance. Several scholars have struggled to reconcile Darwin's account of his intellectual development with the evidence from publications and correspondence. For example, when he started work on species in September 1854, his main objective was to document evidence relating to the mutability (or immutability) of species (van Wyhe, 2007, 192). This does not suggest that he set out with a workable theory of transmutation.

The iconic Darwin

Darwin became concerned about the issue of priority. He knew he was working on a big issue, and he wanted to be first in the field. Some of his friends were aware that Wallace was publishing innovative papers related to this subject and warned Darwin of the need to put his ideas into print. We should note that Darwin was used to publishing academic papers as well as books, and setting out the key elements of his theory in a paper should have been a relatively easy exercise. However, this did not happen. This is circumstantial evidence that his theoretical ideas were still unformed prior to the arrival of Wallace's manuscript.

Against this is Darwin's personal testimony that his theory was in existence and was documented in an unpublished manuscript dated 1844. The crunch issue is: is his testimony believable? Van Wyhe is prepared to accept Darwin's view of history, but Davies amasses evidence and scholarly opinion to demonstrate that, on this matter, Darwin is not a credible witness.

In 2009, it will not be fashionable to question Darwin's character. Perhaps for this reason, Darwin scholars and evolutionary biologists have shunned Davies' book. However, the issues are too important to ignore. This review is written primarily to promote discussion and further analysis. Darwin has become an iconic figure and this is getting in the way of an objective critique of the theory of evolution by natural selection. This is not a satisfactory situation for educationalists or anyone interested in the history of ideas. If Darwin did plagiarise Wallace, the theory still exists as an explanation of the origin of species, but a wedge will have been driven between the theory and the iconic Darwin.

If Davies' arguments are correct, the iconic Darwin needs to be dethroned as a matter of urgency. When this is accomplished, we will be in a better position to reappraise his significance as a scientist. In the meantime, here is a summary paragraph from Davies:

> "Charles Darwin was a very secretive man with a driving ambition. He neither praised nor tipped his hat in the direction of Jean-Baptiste Lamark or of his grandfather Erasmus. He never openly acknowledged his debt to Edward Blyth, nor to Patrick Matthew (who had been one of the first to write about the 'natural means of selection', a phrase that Darwin modified and used without attribution). He never acknowledged his debt to Wallace. By the time Eiseley, Gruber, Beddall, McKinney, Brackman and Brooks began reassembling the long-lost pieces of the jigsaw, the myth-making surrounding Darwin's achievement, which had so worried Darlington in 1959, was complete."

A creationist critic of Darwin conspiracy theories

In the time gap between drafting and finalising this review article, Todd Wood (2009) has claimed "there is no Darwin conspiracy". After reading Wood's rebuttal of Davies' book, I remain convinced that Darwin cannot be vindicated so confidently and that serious questions about the way he conducted and published his research remain unanswered.

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There are two distinct ways in which a scholar can be guilty of plagiarism. The first concerns stealing the words of another; the second involved the theft of the ideas of another. Although Davies includes discussion of words and phrases that appear to have roots in the writings of others, in my judgment, greater weight should be given to the claim that Darwin took ideas and concepts from others, made them his own and failed to acknowledge his sources. It seems to me that Wood's critique is more concerned to vindicate Darwin from stealing the words of others than addressing the question whether he stole the ideas of others and repackaged them using his own words.

Darwin regarded his speciation work as his big project. He was keen to present something to the world. However, although he had accumulated a mountain of data, it was not ready to publish. He needed an integrating theoretical framework to tie it all together. This is why the issues raised by Van Wyhe are so important: was his research on track and Darwin chose not to publish until he had got the Cirripedia study out of the way? Or, was it because he could not find the elusive glue he needed to bring coherence to all the data? Robust evidence that Darwin had the essence of this theoretical framework in 1844 (or at any time before 1858) is lacking, and this is significant. So also is the fact that he did not attempt to publish a paper (rather than a book) on the subject. Darwin was not shy of publishing. He had contributed short papers and long articles to journals. If he had a crucial insight that was not in the public domain, he could easily have put a seminal paper together to build on later.

It has always been a concern to me that Darwin failed to acknowledge his sources. Even when he referred to Blyth and Wallace, it was to their empirical work rather than their contribution to the development of ideas. His *Historical Introduction,* when it first appeared in 1861, was at the instigation of others. This history is remarkable for what it leaves out as well as for what it includes. He wrote: "The great majority of naturalists believe that species are immutable productions, and have been separately created."

However, he should have been able to find evidence that Carl Linnaeus, John Stevens Henslow and Edward Blyth all recognised that speciation from created Kinds was a reality. To have acknowledged this would have been the honourable thing to do, but it would have undermined the style of argumentation made throughout "On the Origin of Species". What looks like unprofessional behaviour to me is interpreted by many in quite a different way. Darwin is the guru, the pioneer, who brought order out of chaos, earning the right to be a stellar figure in the world of science.

Davies draws on numerous Darwin scholars to make his case that there was a conspiracy to deceive, and Wood refers mainly to Eiseley and McKinney. There is much more that needs to be said about the collective research underpinning Davies' book. Perhaps Wood's weakest argument concerns the arrival of Wallace's third letter to Darwin. Basically, Wood says he is not convinced and that the grounds for certainty are lacking. In my judgment, Davies has put together a very strong argument and, at very least, justified the need to open up this issue for wider scrutiny.

Furthermore, Wood does not interact at all with other creationist writers who find Darwin to be unworthy of his iconic position. Bergman, for example, (2002) considers evidences that Darwin borrowed and in some cases plagiarised other researchers, and concludes that Darwin was the populariser rather than the originator of the theory known as Darwinism. Grigg (2004) does much the same thing. Davies' book is not an isolated target but part of a growing awareness that Darwin was not the objective scientist portrayed by his heirs.

I will conclude with some words from John Angus Campbell (1989), who has considered the rhetorical strategies adopted by Darwin in his writings and "as the manager of his own campaign". He points out that Darwin is not thought of as a "wily rhetorician brooding over the problem of persuasion and pulling strings behind the scenes". Yet this aspect of Darwin's character needs to come out.

> "It seems that however we interpret Darwin's rhetorical strategies and tactics, we are left with the discomfiting realization that Darwin the historical truth bearer was not always Darwin the historical truth teller." ■

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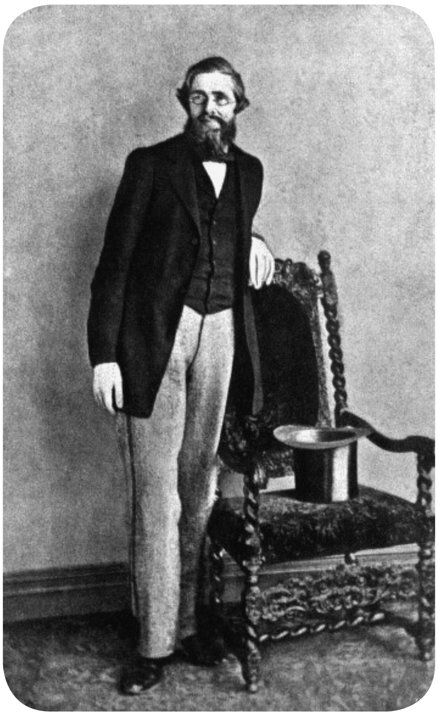
Alfred Russell Wallace, 1862.

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The Darwin Exhibition: distorted history and inexcusable false rhetoric come to London

James Powell

Extraordinary claims require extraordinary evidence – so it is said. One might expect, therefore, that Darwin's 'Big Idea' exhibit (in London's Natural History Museum) would be full of 'big evidence' for his claim of universal common ancestry. Revealingly, however, it isn't. Originally inflicted upon the american public in November 2005, this exhibition has arrived in 'the animal's Westminster Abbey' (as Sir Richard Owen's building was once called) after a long stint States-side. As we shall see, not content with distorting the wider history of the universe, the exhibition's designers have begun to distort the history of the 19th Century *Anno Domini*. This, it seems, is all part of a well-funded strategy to instil unquestioning acceptance of evolution in the minds of school-children across the world.

Everybody loves a hero. Children, especially, are bound to look up to those who champion 'scientific facts' in place of 'silly religious stories', enlightening and liberating societies which have been stunted in their progress by bigoted authoritarians. This general manner of presenting history is known within historical circles as the 'Whig interpretation'. 'Hagiography', on the other hand, is the term used to describe a biography displaying undue reverence for its subject. As presented here, Darwin's historic Beagle voyage, together with his work in Down House, and Victorian society's reaction to the *'Origin of Species'*, clearly illustrate both types of historical revisionism. The underlying reasoning behind these abuses should be obvious. Create in Darwin a friendly, heroic persona and in the minds of most children you will have already won half the battle! After all, why confuse them with the facts when a sanitized version is so much more persuasive.

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> As presented here, Darwin's historic Beagle voyage, together with his work in Down House, and Victorian society's reaction to the 'Origin of Species', clearly illustrate both types of historical revisionism.

A brief description and critique of the Darwin exhibition is not hard to present. The gallery, begins with island biogeography – a study of the distribution of species on islands and island-like patches (which creationists don't dispute[1]). Two mockingbirds lie regally, like religious relics, upon a purple velvet cushion. These birds, from San Christobal and Floreana respectively, are claimed to represent a transition in Darwin's mind, which matured into a notion of universal common ancestry over subsequent years. As such, they are exclaimed as 'two of the most important specimens in the history of science' – even more so than the Galapagos finches! Upon closer investigation, however, it is doubtful that these birds had much impact in the wider development of evolutionary theory at all. Indeed, Darwin already had with him on the Beagle a copy of Bory de Saint-Vincent's *Dictionannaire,* which contained a number of articles on 'adaptive radiations' previously studied in Madagascar (Caton, 2007).

Following these mockingbirds are a series of plant and animal species (some alive) which Darwin catalogued on his five-year voyage. These include the Green Iguana *(Iguana iguana),* the Spotted Octopus *(Octopus vulgaris),* the Sally Lightfoot Crab *(Grapus grapus),* the Blue-Footed Booby *(Sula neboxuii),* the Prickly Pear Cactus *(Opuntia echios),* and the Galapagos Land Iguana *(Conolophus subcristatus)*. Alongside these and other specimens (such as tortoises) are spurious arguments for 'evolution' which really pertain to variations and selection pressures within created 'kinds'. Behind a small wall, a video containing rhetoric to the effect that evolutionary theory is a 'jewel in the crown' of the scientific method – is projected. In both these instances, the confusion of scientific terms 'biological change' and 'universal common ancestry' is painfully apparent and, if I may say so, wholly inexcusable!

The second section of the gallery consists of items relevant to Darwin's family life and personal thought – partly designed to endow him with a halo. Species of lichen plant which Darwin collated adorn an entire wall, whilst a series of glass cabinets contain items of rather crass amusement. Two items remain particularly in mind. The first is a personal note of Darwin's regarding the pros and cons of marriage – one advantage of which is that keeping a wife is 'better than a dog'! The other is a box of mementos (including snippets of Darwin's beard hair) that belonged to Darwin's daughter Etty. The 'highlight' of this section, however, is undoubtedly a full reconstruction of Darwin's study room in Down House; complete with a comfortable armchair and study desk.

Following this there are photographs of human facial expressions

Darwin
BiG iDea
BIG EXHIBITION
14 November 2008 – 19 April 2009
If you had an idea that was going to outrage society, would you keep it to yourself?
DARWIN200

Darwin Exhibition. © James Powell.

British Museum of Natural History. © R. Cambridge.

– with a glowing endorsement of Darwin's work on the expression of the emotions in man and animals. Yet, as Burgess (2004) has noted to the contrary, human facial expressions (and their associated muscles) vastly outnumber those of apes – a fact not easily explained by evolutionary anthropologists! Next to this propaganda piece is a small glass cabinet filled with fossils. Strolling over to this cabinet, one assumes it contains some of the 'best' examples of fossils with transitional features, yet instead discovers a selection of fossil kinds 'as they traditionally used to be arranged' i.e. discontinuously – as the raw data still indicates! Also within this section are a number of distorted historical assertions. Caton (2007), a non-creationist historian of science, has fully rebutted these errors. Perhaps the best course of action here is to briefly outline some of his conclusions.

First, Darwin's *'Origin'* did not, as the exhibition's statements imply, suddenly emancipate Victorian society from the 'shackles' of theological bondage. The sad decline in Theology was actually a process which had gained momentum on the Continent two centuries beforehand, and spread through higher critics and advocates of scientific naturalism[2]. Secondly, Victorian public opinion correctly associated Darwin's account of life with the economic 'Social Darwinism' of Herbert Spencer. The *'Origin'* – contrary to claims within this exhibit – did nothing to change that view. Neither, as it happens, did Darwin's book 'launch' modern biology in any true sense of the word. Empirical science, as practised by the likes of the microbiologist Louis Pasteur and the geneticist Gregor Mendel, was not so much revolutionised as assimilated into a predetermined framework. And finally, again, contrary to this exhibition, there was considerable scientific criticism of the *'Origin',* with many eminent scientists disputing the sufficiency of natural selection as a ratchet or crane for biological complexity. In fact, this widespread rejection of natural selection lead to an 'eclipse' of Darwinism in the decades around 1900 (Bowler, 1983).

Returning, then, to the final section of the gallery, it soon becomes apparent that the same old misrepresentations of creation-based science are going to be peddled once again. At this point, the argument for 'compatibility' between evolutionary science and Christianity is championed.

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Let us pray, therefore, that those who visit this exhibit will not be deceived, but rather shocked at the abject lack of substantive evidence that has been mustered for evolution, despite an enormous financial budget.

A video of theistic evolutionist Kenneth Miller proclaims this compatibility thesis out loud, so that children without a predisposition to read may still take away with them the idea that creationists are making a fuss over nothing. At the same time, creationist arguments are given very short shrift – with one poster-board reading:

> "Creationism, including Intelligent Design, does not offer a scientific alternative to the theory of evolution. By invoking the act of a Creator or an intelligent designer as the explanation for life's diversity, creationism invokes a cause that lies outside our powers of observation and thus outside the realm of scientific enquiry."

One wonders how well the theory of 'multiple universes' (multi-verses) would fair, if the same criteria were rigorously applied across-the-board. These horrors of irrationality are then followed by a small number of displays presenting the modern evidence for Darwin's 'big idea' – universal ancestry. This amounts to the long discredited examples of antibiotic resistance in bacteria, *Hox* genes (as if the mere *existence* of these modular genes were astonishing evidence), the homology of vertebrate forelimbs, DNA similarities, morphological similarities in developmental pathways and a touch-screen simulation of differential survival utilizing different coloured insects. An alternating video presentation on 'why creationism should not be allowed in the science classroom' and 'the evidence for natural selection' follows. Finally, an interactive touch-screen explains how organisms are classified today using dubious phylogenetic (ancestor/descendant) relationships.

To critique all these examples here would be fruitless – as numerous studies have done so on many occasions before. Richard Dawkins, a strong supporter of the gallery once wrote that anybody who didn't believe in evolution must be stupid, insane or ignorant (being careful to add that ignorance is no crime). Given the fact that this exhibition was put together in 2005, however, one begins to wonder why its designers have ignored so many previous responses themselves, including that by Caton (2007). No doubt 2 Peter 3:5-7 provides one explanation – an attitude of *wilful* ignorance. Unlike genuine ignorance, this sort of ignorance is truly criminal – especially when imposed upon the curious minds of children. Yet thanks must be given to our Creator God, that by his grace, He can transform even those who oppose themselves – freely giving them the light of the knowledge of His glory in the face of Jesus Christ (cf. 2 Cor. 4:6). Let us pray, therefore, that those who visit this exhibit will not be deceived, but rather shocked at the abject lack of substantive evidence that has been mustered for evolution, despite an enormous financial budget. ■

Editorial Note

The exhibition closed on 19 April 2009 but an 8 storey, £78 million building, *The Darwin Centre* will open in September 2009, "the most significant expansion at the museum since its move to South Kensington in 1881".

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Acknowledgements

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Notes

[1] See CORE Issues No. 1 at http://www.bryancore.org/issues/number_1.html

[2] See Bowden, M. (2008). 2nd ed. 'The Rise of the Evolution Fraud'. Sovereign Publications, Kent.

Down House. © Paul Garner.

Disputes or dialog in the contemporary debate

A personal plea: *please* permit the debate!

Sylvia Baker

Someone asked me recently what I hoped to see happen as a result of the Darwin bicentennial year, with all its special meetings, publications and media opportunities. After a moment's thought, I replied that I hoped that, by the end of 2009, the creation/evolution debate would actually be permitted to happen.

Of course, in some circles a debate is already taking place. Church groups or student groups hold meetings, a creationist speaks and some discussion follows. However, valuable though this is, it is debate of a very limited kind. What I am calling for, and hoping to see happen, is debate on a much wider front, between groups of people who at present hardly connect with each other. I am also hoping to see the debate, when it happens, conducted in a different spirit from what is often the case at present.

> “ My plea for 2009 is for there to be a change in the way that the media presents the debate, for the strongest possible creationist case to be given considerable exposure.

Debate in the public realm

A fairly-conducted debate needs to happen at a national, public level. At present, creationism is defined as anti-science, ignorance or wickedness, vilified and then rejected by those who are its enemies, while creationists are never given the same opportunity to present what is really their case. Having set up a 'straw man', the 'enemies' proceed to mock and decry it while the creationists are not permitted any proper right of redress. We have all seen or heard examples of this kind of thing. Numerous examples can be found in the scientific journals when they consider creationism only to declare their opposition. Richard Dawkins excels at it. Two instances that I can describe from personal experience both happened on live television. In October 2007, I appeared on BBC One's *Big Questions* programme one Sunday morning. Also appearing was Dr. Jeremy Pritchard from the School of Biosciences at the University of Birmingham, an active promoter of evolution to the general public. When given an opportunity to speak, Jeremy said that it was impossible for creationists to be scientists; belief in the supernatural would make the conducting of scientific experiments impossible because you would never know when God might interfere. Also, he said, creationism is incapable of making any testable predictions. I was the invited creationist on the panel but was given no opportunity at all to reply to these false allegations. In private, afterwards, I pointed out to Jeremy how many of the world's greatest scientists had been exactly the kind of 'supernaturalists' that he so despised and also made him aware of creationist testable predictions but none of this was permitted to happen on air.

The second instance happened in September 2008. I was invited to appear on Sky News in connection with the forced resignation of Professor Michael Reiss from his position at the Royal Society. This time my opponent was the journalist and programme presenter Rod Liddle. Rod was allowed considerable time to speak very insultingly about people who believed in fairies at the bottom of the garden and who had been brain washed by ignorant church leaders. I was allowed time for a very brief response, but the final word was given to Rod who was then permitted to continue to denigrate me and my position for quite a while.

Which other group in society is treated in this way? Why is it permitted to happen? My plea for 2009 is for there to be a change in the way that the media presents the debate, for the strongest possible creationist case to be given considerable exposure.

Debate in the classroom

I believe that during 'Darwin year' we should take every opportunity to point out how unfair is the kind of treatment described above and to call for both sides of the argument to be put forward in an honourable and equal fashion. For example, why should Richard Dawkins be allowed to make programme after programme attacking creationism when we are not permitted even one? The answer to that would probably be that evolution is science but creationism is religion. This is the kind of argument that is being used to keep the debate out of the science classroom, so my second plea is that the debate should be not merely be permitted but actively encouraged in schools. I have had the privilege of teaching school science from a creationist viewpoint and have seen how beneficial it can be for the pupils concerned. It gives them the opportunity to weigh the evidence on both sides of the argument and they go on to achieve very well in science exams. Michael Reiss estimates that about ten percent of all state school pupils are creationists and has called for them to be treated with more respect. At present these young people may well have to sit in science classes listening to the kind of mockery that I have described above. They will be told that there is overwhelming evidence for evolution but if they question that evidence they will be told that they have to be quiet and can only raise such issues in the RE lesson. Their concerns are to do with the interpretation of scientific evidence. Why, therefore cannot such issues be debated in the science class as well as in RE? The creation/evolution debate operates at the interface between science and religion and cannot be confined to one or the other. Insisting that evolution is science while creationism is religion has the effect of silencing one party to the debate.

Debate in the wider church

Many Christians are evolutionists of one variety or another. My third plea is that a respectful debate should be permitted and encouraged within the wider church. Dr. Denis Alexander has described the sort of thing I mean in his book *Creation or Evolution: do we have to choose?* where he says (pages 11-12):

> The last thing I would want is for this topic to be a matter for dissension or disunity amongst believers. This book is written as a discussion and a dialogue. Of course it expresses a particular point of view, but where there are differences I hope these can be aired amicably in a spirit of Christian love.

My impression of the book is that it is more a monologue than a dialogue, but I certainly agree with the sentiments about loving and amicable debate between Christians. That is exactly what I would like to see happen more. Unfortunately, later in the book, Denis fails to heed his own advice (page 352-3):

> Christians who make it their mission to attack evolution, in the mistaken assumption that it is anti-God, are embarrassing and bring the Gospel into disrepute… Christian campaigns against evolution represent a giant 'red-herring', distracting believers from far more important pursuits.

So creationists are embarrassing and disreputable, their concerns are not worth bothering about and Denis would actually like to see them silenced.

The same point of view is expressed by R. J. Berry in an essay entitled *Science in a Christian University* where he refers to creationism as 'sub-Christian' and argues that a Christian university for the UK would present practical difficulties because to permit one might give an opportunity for a defence of creationism (pages 227 and 230). Once again, a Christian expresses a wish for the debate to be silenced.

We creationists could actually learn a lot from the expertise of scientists like Denis Alexander and R. J. Berry. They need to remember that they occupy, or have occupied, privileged positions that would almost certainly be denied to anyone aspiring to be a professional scientist who was also openly a creationist. My plea is that they should stop insulting us and engage with the best of our arguments, not just the points where they think they have an advantage. Let us have a genuine debate, treating each other as equals.

Debate within the creationist community

So far I have criticised the media, the education system and the theistic evolutionists for their attitudes to creationists. It is only fair that we should also be prepared to turn the spotlight on to ourselves. Within creationism, there are a number of issues which are the subject of legitimate debate. Two examples would be the location of the Flood boundaries in the geological column and the nature and limits of the created kinds. I see the existence of these debates as a very positive sign. It gives the lie to the accusation that we are just promoting a fundamentalist ideology and supports our contention that creationism involves genuine scientific enquiry. It is a reflection of our history. After all, many key figures in the history of science have been young-earth creationists and the position led them directly to very fruitful scientific discoveries. We should not be afraid of debate within our own community. We should welcome it and seek to conduct it 'amicably, in a spirit of Christian love', just as advocated by Denis Alexander.

Conclusion

It might be too much to hope that the media, the educationalists and the theistic evolutionists will heed the pleas that I have expressed, although that is certainly my prayer. I have more confidence in my colleagues in the creationist movement.

In 2009, why should we not aim to model to the world that respect for each other, that teachable spirit and that amicable, Christian love which we would like to see displayed by all parties to this important debate. ■

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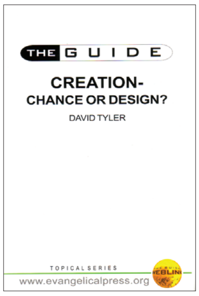
Some recent contributions to the debate by BCS members



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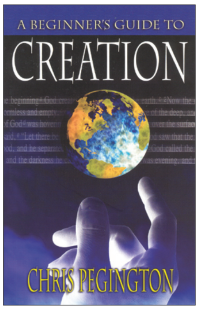

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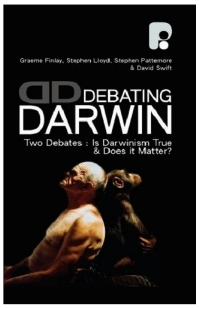
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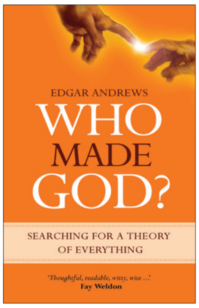

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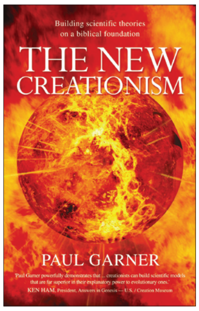

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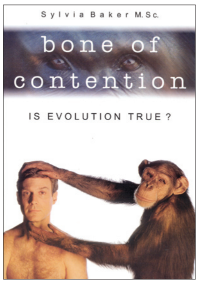

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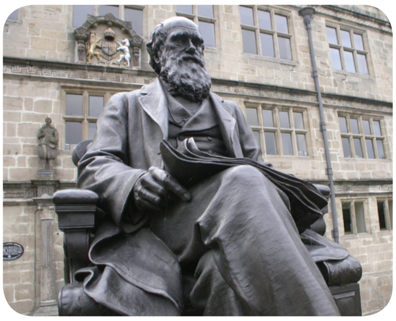

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